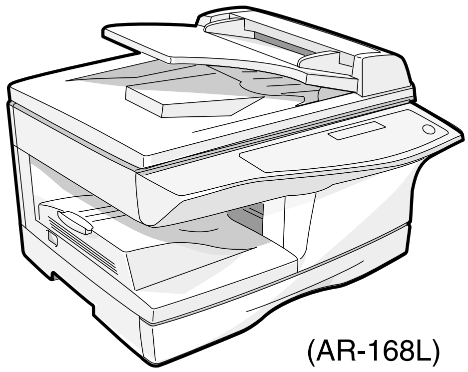
SHARP SERVICE MANUAL

CODE : 00ZAR168N/A1E



(AR-168L)

DIGITAL MULTIFUNCTIONAL SYSTEM

MODEL AR-168N AR-168L

CONTENTS

Parts marked with "⚠" are important for maintaining the safety of the machine. Be sure to replace these parts with the replacement parts specified to maintain the safety and performance of the machine.

SHARP CORPORATION

CAUTION

This product is a class 1 laser product that complies with 21CFR 1040 of the CDRH standard and IEC825. This means that this machine does not produce hazardous laser radiation. The use of controls, adjustments or performance of procedures other than those specified herein may result in hazardous radiation exposure.

This laser radiation is not a danger to the skin, but when an exact focusing of the laser beam is achieved on the eye's retina, there is the danger of spot damage to the retina.

The following cautions must be observed to avoid exposure of the laser beam to your eyes at the time of servicing.

1) When a problem in the laser optical unit has occurred, the whole optical unit must be exchanged as a unit, not as individual parts.
2) Do not look into the machine with the main switch turned on after removing the developer unit, toner cartridge, and drum cartridge.
3) Do not look into the laser beam exposure slit of the laser optical unit with the connector connected when removing and installing the optical system.
4) The middle frame contains the safety interlock switch.

   Do not defeat the safety interlock by inserting wedges or other items into the switch slot.

CLASS 1
LASER PRODUCT

LASER KLASSE 1

LASER WAVE – LENGTH : 770 – 795nm
Pulse times : 10.24µsec
Out put power : 0.15mW ± 0.01mW

CAUTION

INVISIBLE LASER RADIATION,
WHEN OPEN AND INTERLOCKS DEFEATED.
AVOID EXPOSURE TO BEAM.

VORSICHT

UNSICHTBARE LASERSTRAHLUNG,
WENN ABDECKUNG GEÖFFNET UND
SICHERHEITSVERRIEGELUNG ÜBERBRÜCKT.
NICHT DEM STRAHL AUSSETZEN.

VARO !

AVATTAESSA JA SUOJALUKITUS
OHITETTAESSA OLET ALTTIINA
NÄKYMÄTTÖMÄLLE LASERSÄTEILYLLE ÄLÄ
KATSO SÄTEESEEN.

ADVARSEL

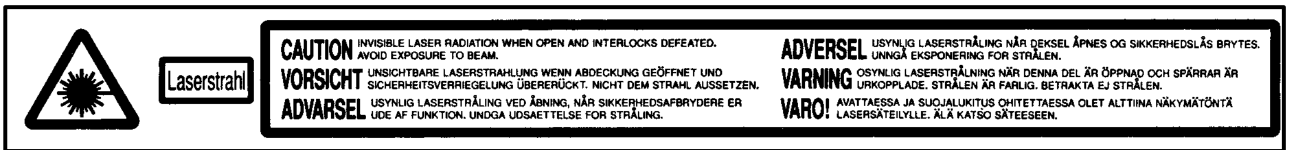
USYNLIG LASERSTRÅLNING VED ÅBNING, NÅR
SIKKERHEDSBRYDERE ER UDE AF
FUNKTION. UNDGÅ UDSAETTELSE FOR
STRÅLNING.

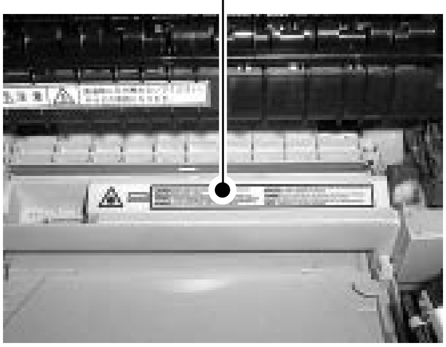
VARNING !

OSYNLIG LASERSTRÅLNING NÄR DENNA DEL
ÄR ÖPPNAD OCH SPÄRREN ÄR URKOPPLAD.
BETRAKTA EJ STRÅLEN. – STRÅLEN ÄR
FARLIG.

At the production line, the output power of the scanner unit is adjusted to 0.57 MILLI-WATT PLUS 20 PCTS and is maintained constant by the operation of the Automatic Power Control (APC). Even if the APC circuit fails in operation for some reason, the maximum output power will only be 15 MILLI-WATT 0.1 MICRO-SEC. Giving and accessible emission level of 42 MICRO-WATT which is still-less than the limit of CLASS-1 laser product.

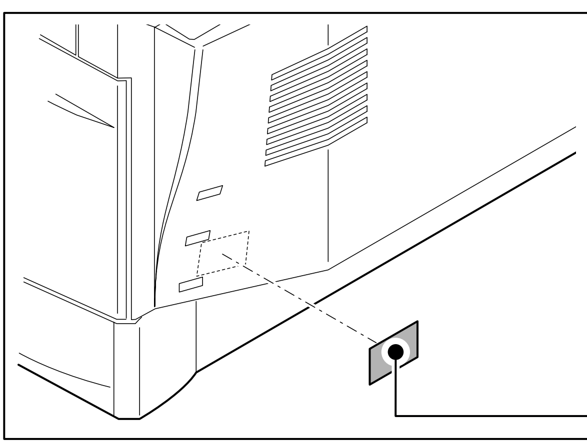
Caution
This product contains a low power laser device. To ensure continued safety do not remove any cover or attempt to gain access to the inside of the product. Refer all servicing to qualified personnel.





VAROITUS! LAITTEEN KÄYTTÄMINEN MUULLA KUIN TÄSSÄ KÄYTTÖOHJEESSA MAINITULLA TAVALLA SAATTAA ALTISTAA KÄYTTÄJÄN TURVALLISUUSLUOKAN 1 YLITTÄVÄLLE NÄKYMÄTTÖMÄLLE LASERSÄTEILYLLE.

VARNING - OM APPARATEN ANVÄNDS PÅ ANNAT SÄTT ÄN I DENNA BRUKSANVISNING SPECIFICERATS, KAN ANVÄNDAREN UTSÄTTAS FÖR OSYNLIG LASERSTRÅLNING, SOM ÖVERSKRIDER GRÄNSEN FÖR LASERKLASS 1.



The foregoing is applicable only to the 220V model, 230V model and 240V model.

CLASS 1
LASER PRODUCT

LASER KLASSE 1

LUOKAN 1 LASERLAITE
KLASS 1 LASER APPARAT

CONTENTS

[1] GENERAL

1. Major functions

Configurations

Item / Model	CPM / PPM		SB/ MB	2 Tray	SPF	R-SPF	Color Scanner (push)	GDI printer	SPLC	E-SORT	Duplex	Shifter	FAX	Sharp desk	IEEE 1284	USB	RJ45	External NIC
	LT	A4																
AR-168N	16	15	MB	Opt	×	×	❍	×	❍	❍	❍	❍	×	❍	❍	❍ (2.0)	×	❍
AR-168L	16	15	MB	Opt	×	❍	❍	×	❍	❍	❍	❍	×	❍	❍	❍ (2.0)	×	Opt

Descriptions of items

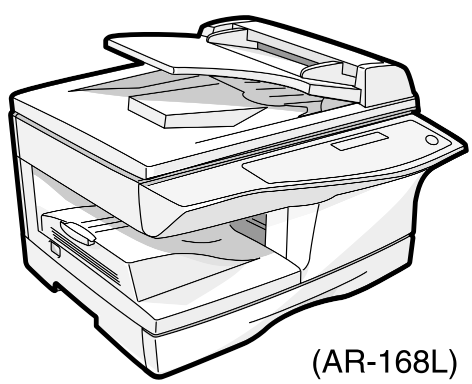
CPM:	Copy speed (Copies Per Minute)
SB/MB:	SB = Manual feed single bypass, MB = Manual feed multi bypass
2 tray:	Second cassette unit
SPF:	Original feed unit
R-SPF:	Duplex original feed unit
Color scanner:	Color scanner function
GDI printer:	GDI printer function with USB
SPLC:	SPLC printer function
E-SORT:	Electrical sort
Duplex:	Auto duplex copy function
Shifter:	Job separator function
FAX:	FAX function
Sharpdesk:	Scanner utilities
IEEE1284:	Interface port (parallel)
USB:	Interface port (USB)
RJ45:	Interface port (Network)
External NIC:	AR-NB2N

Descriptions of table

❍: Standard provision

×: No function or no option available

Opt: Option



(AR-168L)

2. Note for servicing and handling

When the main unit power is repeatedly turned OFF/ON rapidly (for about 1sec), the IC (OA982) on the MCU PWB may malfunction to cause an error (E1-00 Communication error), which does not boot the machine. In case of this error, the blank display is kept for several tens seconds and then "E1-00" is displayed on the panel display.

<Countermeasure>

Turn off the power and keep it for more than 10sec. Then turn on the power.

When the machine is booted.: There is no problem in the MCU PWB.

When the machine is not booted.: The MCU PWB trouble

[2] SPECIFICATIONS

1. Basic Specifications

Item			
Type		Desktop	
Copy system		Dry, electrostatic	
Segment (class)		Digital personal copier	
Copier dimensions	AR-168N	20.4"(W) x 19.8"(D) x 11.7"(H) (518mm(W) x 503mm(D) x 296mm(H))	
	AR-168L	20.4"(W) x 19.8"(D) x 15.0"(H) (518mm(W) x 503mm(D) x 380mm(H))	
Weight (Approximately)	AR-168N	37.0lbs.(16.8Kg)	TD and drum cartridges included
	AR-168L	44.1lbs.(20.0Kg)	

2. Operation specifications

Section, item			Details	
Paper feed section	Paper feed system			1 tray (250 sheets) + multi bypass (50 sheets)
	AB system	Tray paper feed section	Paper size	A4, B5, A5, 16K (Landscape)
			Paper weight	56 - 80g/m^2 (15 - 21 lbs.)
			Paper feed capacity	250 sheets
			Kinds	Standard paper, specified paper, recycled paper
			Remark	User adjustment of front paper guide available
		Multi bypass paper feed section	Paper size	A4, B5, A5, B6, A6 (Post card), 16K (Landscape)
			Paper weight	52 - 128g/m^2 (14 - 34.5 lbs.)
			Paper feed capacity	50 sheets
			Kinds	Standard paper, specified paper, recycled paper, envelope, OHP, Label (Single copy)
			Remark	User adjustment of side paper guide available
	Inch system	Tray paper feed section	Paper size	8-1/2" x 14", 8-1/2 x 11", 8-1/2" x 5-1/2" (Landscape)
			Paper weight	15 - 21 lbs.
			Paper feed capacity	250 sheets
			Kinds	Standard paper, specified paper, recycled paper
			Remark	User adjustment of front paper guide available
		Multi bypass paper feed section	Paper size	8-1/2" x 14", 8-1/2 x 11", 8-1/2" x 5-1/2", 3-1/2" x 5-1/2" (Landscape)
			Paper weight	14 - 34.5 lbs.
			Paper feed capacity	50 sheets
			Kinds	Standard paper, specified paper, recycled paper, OHP, Label, Envelop (Single copy)
			Remark	User adjustment of side paper guide available
Paper exit section		Exit way		Face down
		Capacity of output tray		200 sheets (A4/Letter Standard paper, Normal Condition)
Originals		Original set		Center Registration (left edge)
		Max. original size		A4 (8-1/2" x 14")
		Original kinds		sheet, book
		Original size detection		None
Optical section	Scanning section	Scanning system		3 CCDs (RGB) sensor scanning by lighting white lamp
		CCD sensor	Resolution	600 dpi
		Lighting lamp	Type	CCFL
			Voltage	560Vrms
			Power consumption	2.8W
		Output data		R, G, B 1 or 8 bits/pixel / A/D 16bit
	Writing section	Writing system		Writing to OPC drum by the semiconductor laser
		Laser unit	Resolution	600 dpi
Image forming		Photoconductor	type	OPC (30ø)
			Life	18k
		Charger	Charging system	Saw -tooth charging with a grid, / (-) scorotron discharge
			Transfer system	(+) DC scorotron system
			Separation system	(-) DC scorotron system
		Developing	Developing system	Dry, 2-component magnetic brush development system
		Cleaning	Cleaning system	Counter blade system (Counter to rotation)

Section, item		Details	
Fusing section	Fusing system		Heat roller system
	Upper heat roller	type	Teflon roller
	Lower heat roller	type	Silicon rubber roller
	Heater lamp	type	Halogen lamp
		Voltage	120V
		Power consumption	800W
Electrical section	Power source	Voltage	120V
		Frequency	60Hz
		Rated current	8A
	Power consumption	Max.	Less than 1000W
		Average (during copying)	350 Wh/H *1)
		Average (stand-by)	86Wh/H *1)
		Pre-heat mode	25Wh/H *1)
		Auto power shut-off mode	8.8Wh/H *1)

*1) May fluctuate due to environmental conditions and the input voltage.

3. Copy performance

Section, item			Details	
Copy magnification		Fixed magnification ratios		4 Reduction + 3 Enlargement (AB system : 25, 50, 70, 86, 100, 141, 200, 400%) (Inch system : 25, 50, 64, 78, 100, 129, 200, 400%)
		Zooming magnification ratios		OC: 25 - 400% (376 steps in 1% increments), RSPF: 50 - 200% (151 steps in 1% increments)
Manual steps (text, photo)				5 steps
Copy speed		First copy time	Tray paper feed	9.6 sec. (Pre-heat mode: 25 sec. / Auto power-shut-off mode: 40 sec.) A4 or Letter/100%/Auto Exposure *1)
	AB system A4 (Landscape)	Copy speed (CPM)	Same size	15
			Enlargement	15
			Reduction	15
	AB system B5 (Landscape)	Copy speed (CPM)	Same size	15
			Enlargement	15
			Reduction	15
	Inch system 8-1/2" x 14" (Landscape)	Copy speed (CPM)	Same size	12
			Enlargement	12
			Reduction	12
	Inch system 8-1/2" x 11" (Landscape)	Copy speed (CPM)	Same size	16
			Enlargement	16
			Reduction	16
Max. continuous copy quantity				99 (Multi-copy)
Void		Void area	leading edge	1 - 4mm
			Trailing edge	4mm or less, 6mm or less (Duplex copying/both image)
			Side void area	0.5mm or more (per side) 4.5mm or less (total of both sides)
		Image loss	leading edge	Same size: 3.0mm or less (OC) / 4.0mm or less (R-SPF/Duplex) Enlarge: 1.5mm or less (OC) / 3.0mm or less (R-SPF/Duplex) Reduction (50%): 6.0mm or less (OC) / 8.0mm or less (R-SPF/Duplex)
Warm-up time				0 sec.
Power save mode reset time				0 sec.
Paper jam recovery time				0 sec.

*1) Under the polygon ready condition.

4. SPLC printer

Print speed	Max. 15ppm (A4 / with ROPM) / 16ppm (Letter / with ROPM)
First print time	9.6 sec. (without data transfer time)
Duplex	Yes
ROPM	Yes
CPU	None
Memory	Share the memory with E-SORT function
Interface	RJ45 (10 base) / USB 2.0
Network	Internal NIC
Emulation	SPLC (JBIG GDI)
MIB support	No
Resolution	600dpi *1
Supported OS	Win 95 / 98 / Me / NT 4.0 / 2000 / XP
WHQL support	Yes *2
Application	Status window

*1: Engine Resolution

*2: Running change

5. Scan function

Type	Flat Bed Color Scanner
Scanning system	Document glass / SPF (AR-168N) / RSPF (AR-168L)
Light source	3 CCDs (RGB) sensor scanning by lighting white lamp (2 pcs of CCFL)
Resolution	Optical: 600 x 1200dpi Setting range: 50 - 9600dpi (Preview resolution is fixed at 75dpi)
Originals	Sheet type / Book type
Output data	R, G, B 1 or 8 bits/pixel / A/D 16bit
Scan range	OC / RSPF: 8.5" (297mm) (L) x 14" (431mm) (W) Original position: Platen: Left center / SPF: Right center
Scan speed	OC / SPF: Max. 2.88ms/line (Color/Gray scale), Max. 0.96 ms/line (B & W)
Protocol	TWAIN / WIA (Only XP) / STI
Support file format	RAW / JPEG
Interface	USB2.0
Scanner utility	Button Manager / Sharpdesk
Scan key/lamp	Yes
Duplex scan	No
Supported OS	Win 98 / Me / 2000 / XP
Void area	No (User settable by PC)
WHQL supported	Yes *1

*1: Running change

6. RSPF

Original capacity		30 sheets (52 to 90g/m^2) (14 to 23.9 lbs.)	
Original size		A4 to A5 / 8-1/2" x 14" to 5-1/2" x 8-1/2"	
Original replacement speed		12CPM (A4/8-1/2" x 11"Landscape)	
Job speed (Tray1,Landscape)	Single copy	S to S	12CPM
		S to D	5.6CPM
		D to S	5.5CPM
		D to D	5.2CPM
	Multi copy	S to S	16CPM
		D to S	16CPM
Original placement		Face up	
Original weight		52 to 90g/m^2(14 - 23.9lbs.)	
Mixed feeding		No	
Original which cannot		Thermal papers, originals with punch holes for files, be used folded paper, transparent originals such as OHP films, stapled or clip used originals with cover up liquid used, Originals with tape sealed, originals with high level frictional coefficient such as photos or catalogs.	

[3] CONSUMABLE PARTS

1. Supply list

A. LAG

No.	Item	Content	Life	Product name	Package	Remark
1	Toner CA (Black) (with IC chip)	Toner × 10 (Toner: Net Weight 243g) Polyethylene bag × 10	80K	AR-152LTB	1	∗ Life setup is based on A4 6%. MT=NT ∗10
2	Developer	Developer × 10 (Developer: Net Weight 170g)	250K	AR-152MD	1	MD=ND ∗10
3	Drum kit	Drum × 1 Drum fixing plate × 1	25K	AR-152DR	10	
4	Toner refill kit	Toner (bottled) × 10 (Toner: Net Weight 243g) Filling nozzle × 1 Toner cap × 10 IC tip × 10	80K	AR-152RH	1	∗ Life setup is based on A4 6%.

Note: Printing of the master/individual cartons for toner cartridge and toner refill kit is made in 5 languages, English/French/Germany/Spanish/Portuguese.
Printing of the master/individual cartons for developer and drum is made in 2 languages, English/French.

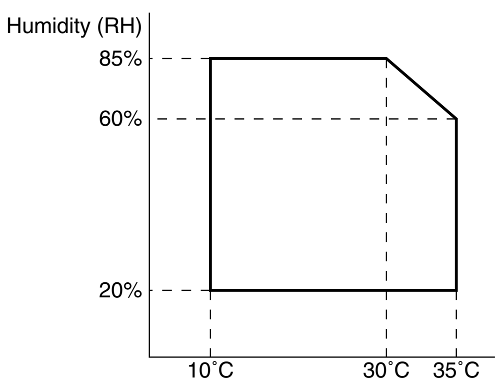
2. Environmental

The environmental conditions for assuring the copy quality and the machine operations are as follows:

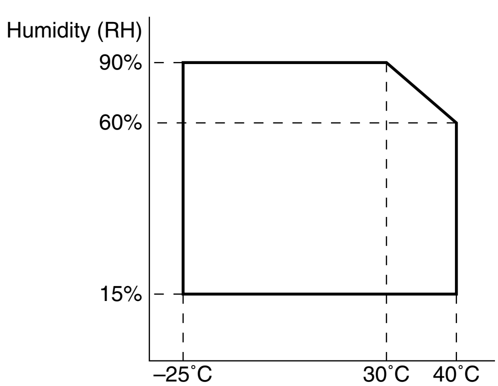
(1) Normal operating condition

Temperature: 20°C to 25
Humidity: 65 ± 5%RH

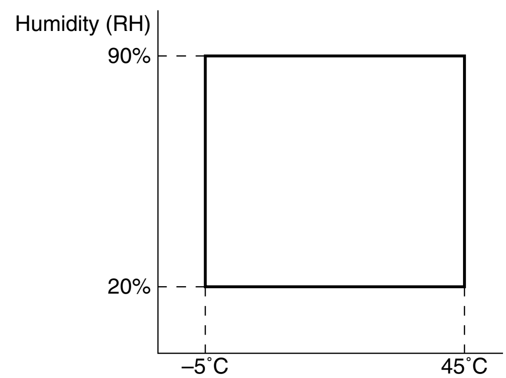
(2) Acceptable operating condition



(3) Transportation condition

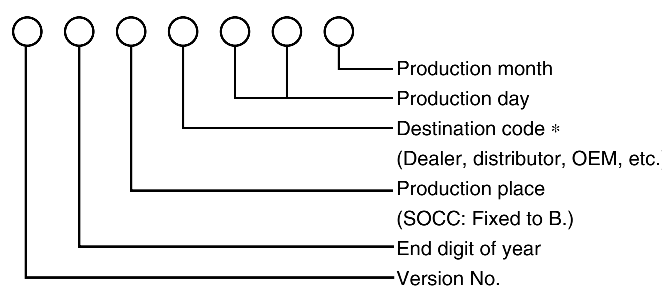


(4) Supply storage condition



3. Production control number (lot No.) identification

<Toner cartridge>

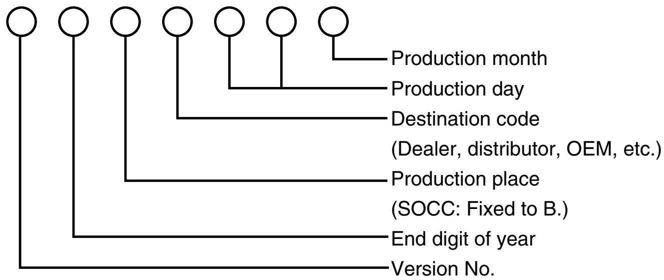


∗: Destination code

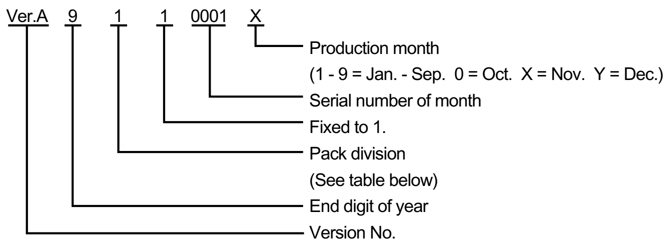
Classification		No.
EX Destination	A packed with machine	G
	B packed with machine	H
Option Destination	A	P
	B	Q

<Drum cartridge>

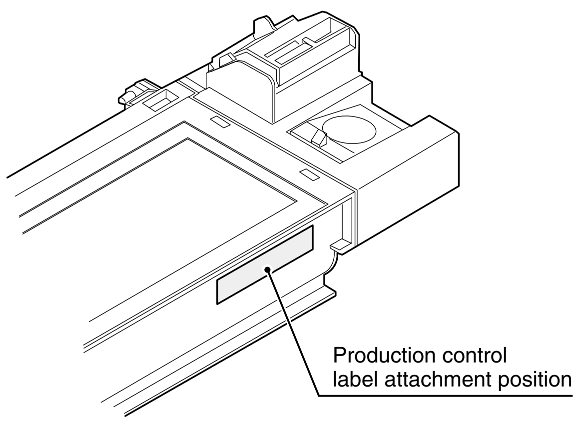
The label on the drum cartridge shows the date of production.
(SOCC production)

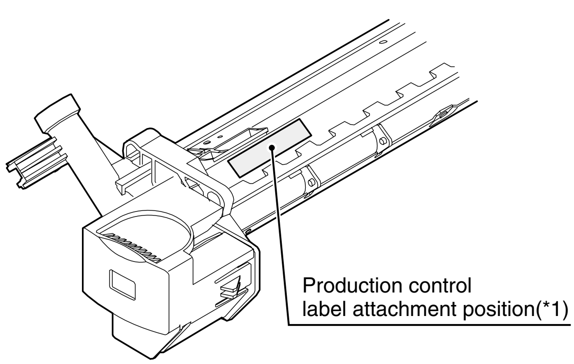


(JAPAN production)



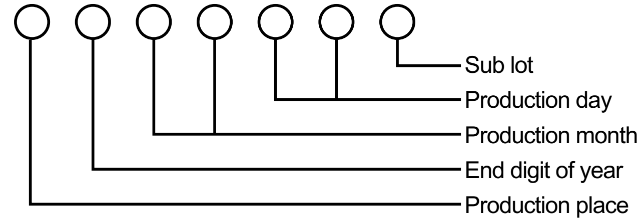
Division	No.
Option	2
Packed with machine	3





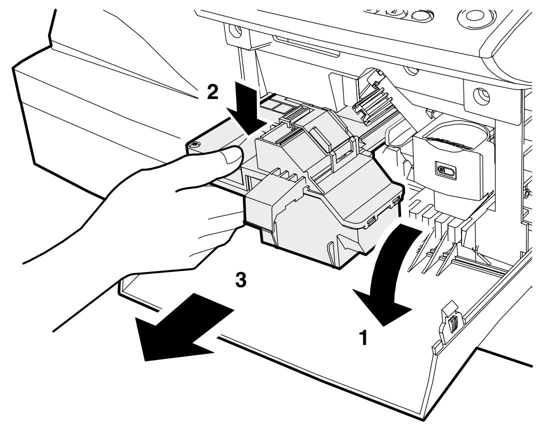
∗1 The production control label is not attached to the cartridge of a China product.

<Developer>

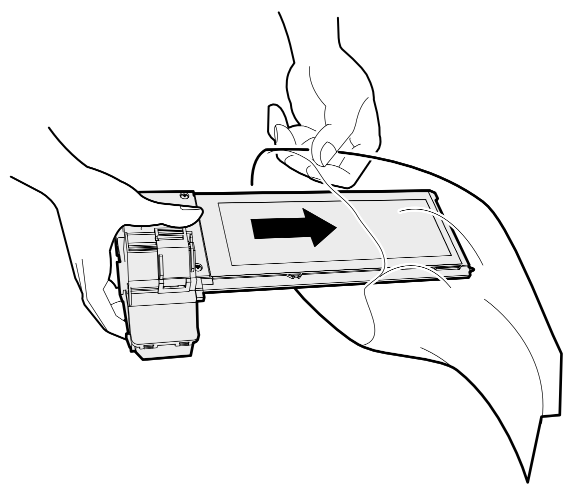


4. TD cartridge replacement

1) Open the front and side cabinets of the copier.
2) Keep holding Toner lover, and
3) Carefully pull out Toner unit from the copier.



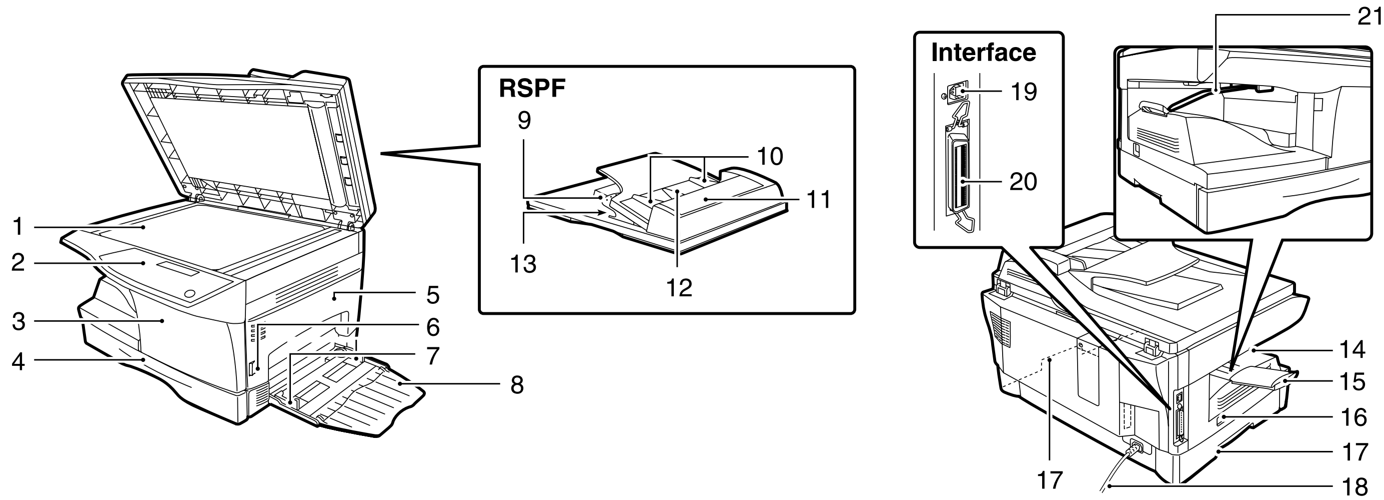
4) Put Toner unit in a collection bag immediately after removing it from the copier



Note: Never carry exposed Toner unit. Be sure to put it in the collection bag.

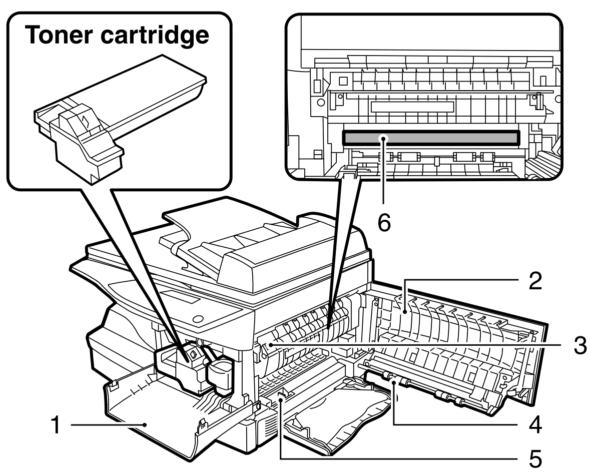
[4] EXTERNAL VIEWS AND INTERNAL STRUCTURES

1. Appearance



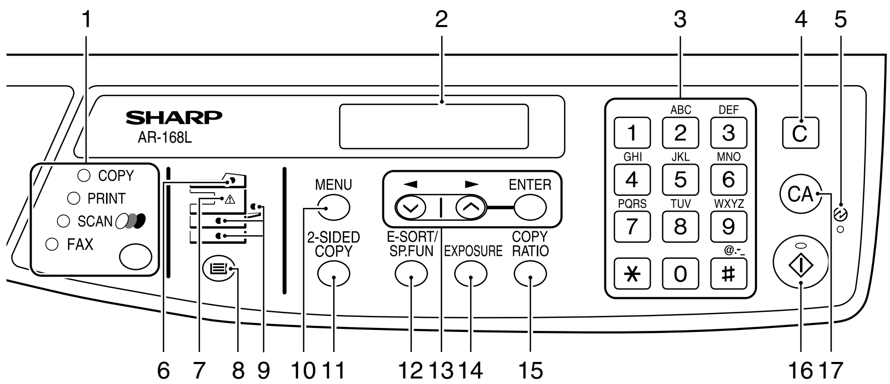
1	Document glass	2	Operation panel	3	Front cover
4	Paper tray	5	Side cover	6	Side cover open button
7	Bypass tray paper guides	8	Bypass tray	9	Reversing tray
10	Original guides	11	Document feeder cover	12	Document feeder tray
13	Exit area	14	Paper output tray	15	Paper output tray extension
16	Power switch	17	Handles	18	Power cord
19	USB connector	20	Parallel connector	21	Paper holder arm

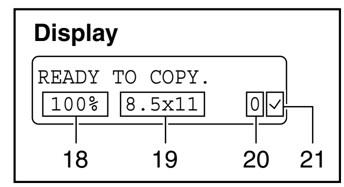
2. Internal



1	Front cover	2	Side cover	3	Fusing unit release lever
4	Transfer charger	5	Charger cleaner	6	Photoconductive drum

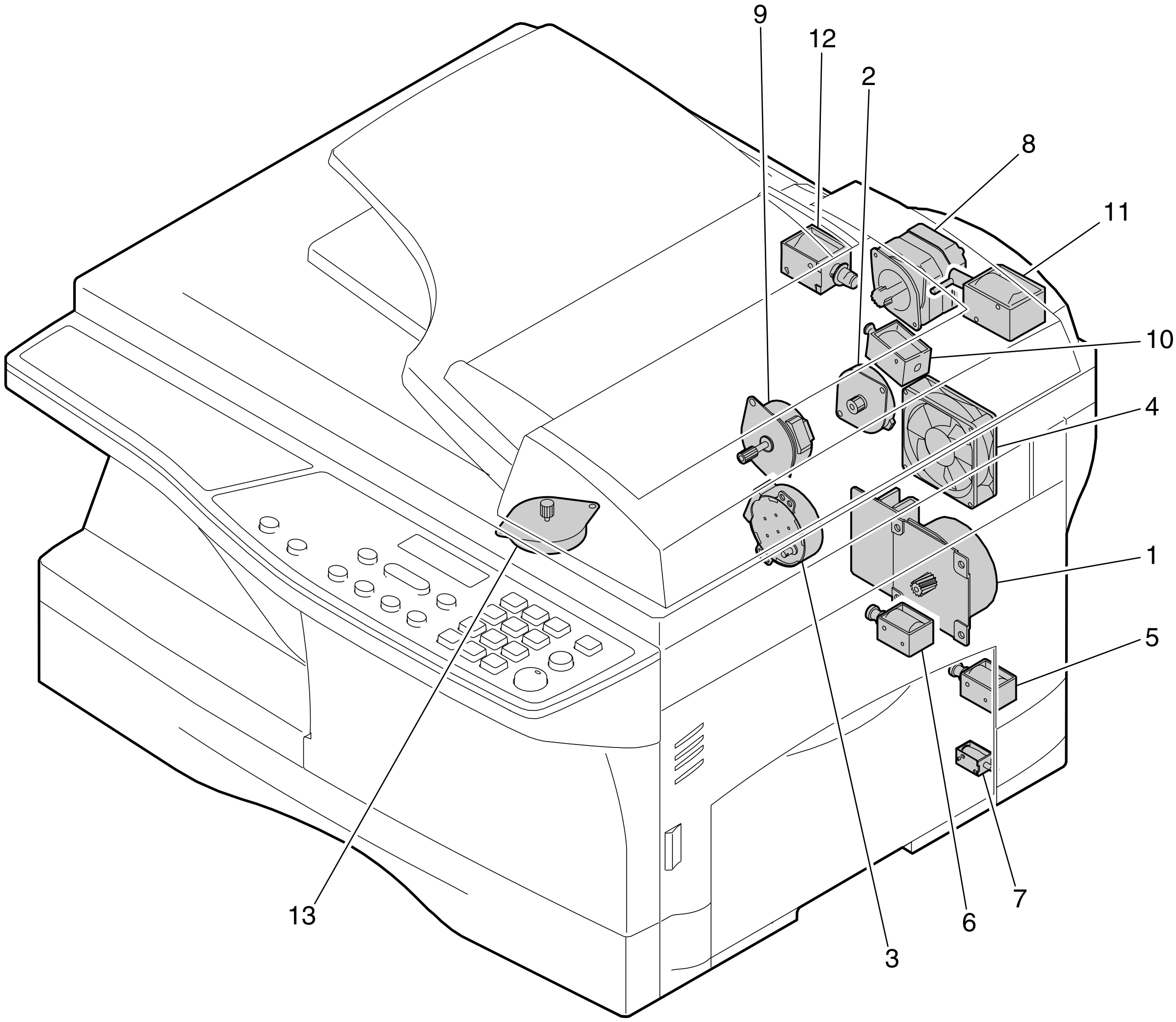
3. Operation panel





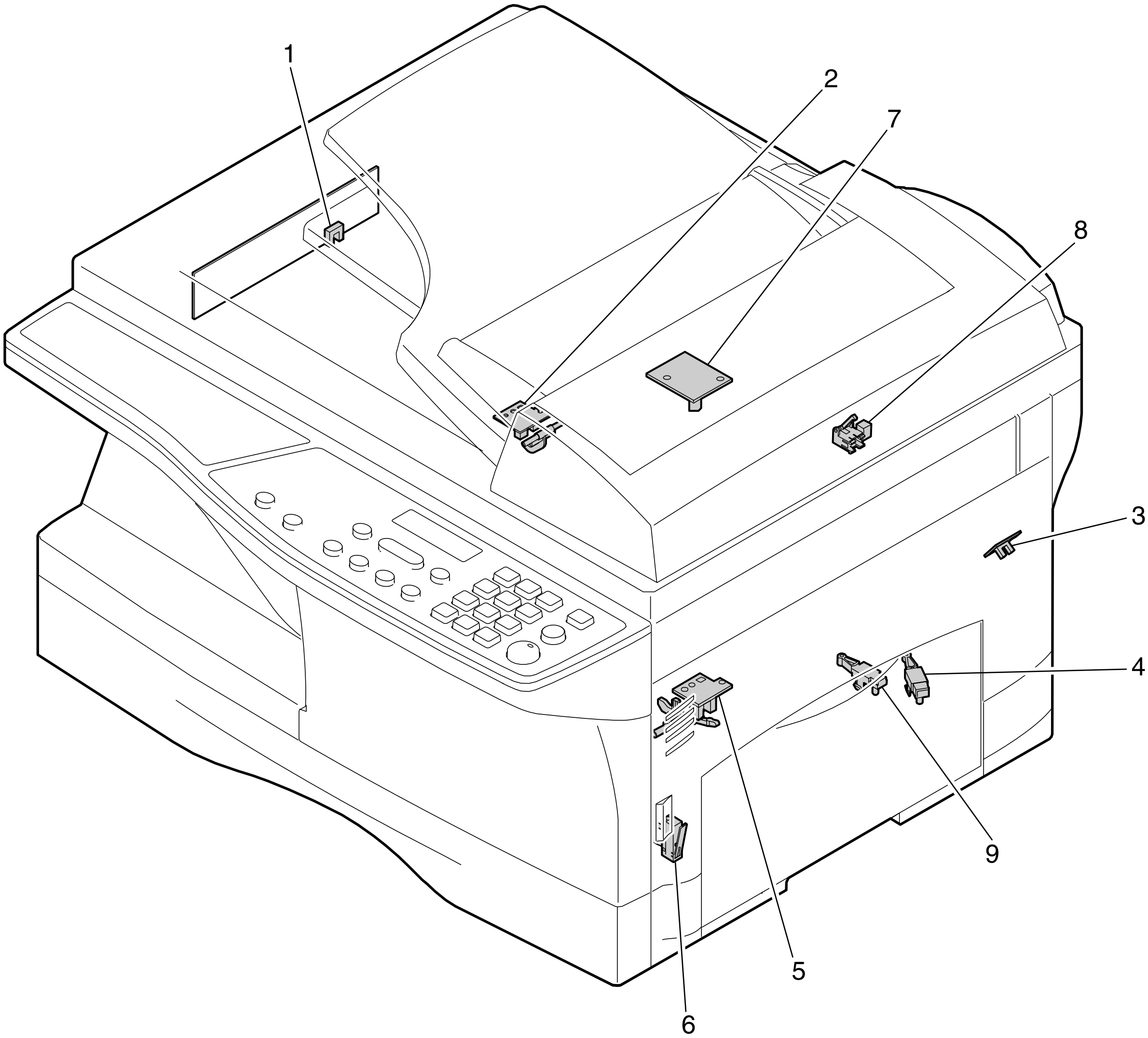
1	**[MODE SELECT] key / Mode indicators** Press this key to select the mode. The indicator of the selected mode lights (copy, printer, scanner, fax mode indicators).	2	**Display** This shows messages indicating the machine status and any problems that occur, as well as user programs and function setting menus.
3	**Numeric keys** Use these to enter the number of copies and other numerical settings. The keys can also be used to select items in function setting menus.	4	**[CLEAR] key (C)** Use this to clear the set number of copies, as well as cancel a job that is in progress. When a setting menu appears, use this key to move back to the previous menu level.
5	**Power save indicator** This lights up when the power save function is activated.	6	**RSPF indicator (AR-168L only)** This lights up when an original is placed in the RSPF.
7	**Error indicator** This lights steadily or blinks when a paper misfeed or other error occurs.	8	**[TRAY SELECT] key ( )** Use to select the paper tray that has the desired paper for copying.
9	**Tray location indicator** Indicates the selected paper tray. The indicator blinks when the tray is out of paper or is not closed.	10	**[MENU] key** Press this key to select the paper size for copying, to configure a user program or to display the total count.
11	**[2-SIDED COPY] key** Press to select the automatic two-sided copying mode.	12	**[E-SORT/SP.FUN] key** Press to select the sort function, 2 IN 1 copy function, or margin shift function.
13	**[◄] key ( ), [►] key ( ), [ENTER] key** Press the [◄] key ( ) or [►] key ( ) to select an item in a function setting menu. Press the [ENTER] key to enter a selection.	14	**[EXPOSURE] key** Use to switch from auto exposure adjustment to text mode or photo mode.
15	**[COPY RATIO] key** Press to select an enlargement or reduction ratio. To select a preset ratio setting, press the [COPY RATIO] key and select the desired preset ratio. To select a ratio that is not preset, press the [COPY RATIO] key, select the preset ratio that is closest to the desired ratio, and then press the [◄] key ( ) or [►] key ( ) to increase or decrease the ratio in increments of 1%.	16	**[START] key ( ) / Ready indicator** The ready indicator lights up when copying or scanning is possible. To begin copying, press the [START] key ( ). The [START] key ( ) is also pressed to return to normal operation from auto power shut-off mode.
17	**[CLEAR ALL] key (CA)** This returns all functions to the default settings. When pressed in a setting menu, this returns the settings and display to the initial state.	18	Shows the current copy ratio.
19	Shows the selected paper size.	20	Shows the number of copies that has been entered with the numeric keys.
21	A checkmark " ✓ " appears when the exposure has been changed, or when two-sided copying, sort, 2 IN 1, or margin shift is selected.		

4. Motors and solenoids



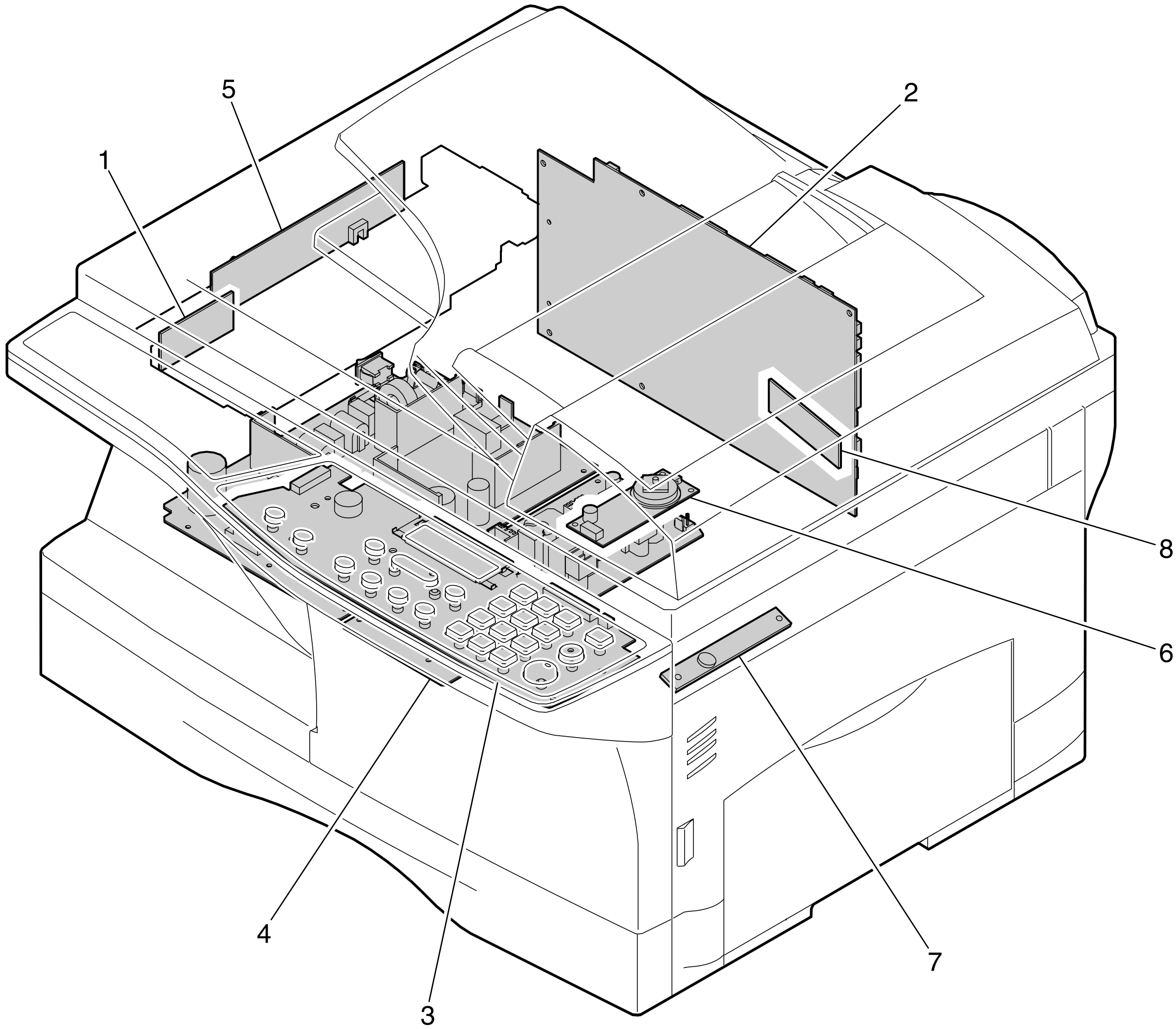
No.	Part name	Control signal	Function / Operation
1	Main motor	MM	Drives the copier.
2	Scanner motor	MRMT	Drives the optical mirror base (scanner unit).
3	Toner motor	TM	Supplies toner.
4	Cooling fan motor	VFM	Ventilate the fuser section.
5	Resist roller solenoid	RRS	Resist roller rotation control solenoid
6	Paper feed solenoid	CPFS1	Cassette Paper feed solenoid 1
7	Multi paper feed solenoid	MPFS	Multi manual pages feed solenoid
8	SPF motor	SPFM	Drives the single pass feeder (AR-168L only)
9	Duplex motor	DMT	Devices the duplex paper transport section
10	Original feed solenoid	SPUS	Original pick up solenoid
11	SPF paper feed solenoid	SPFS	Original feed solenoid (AR-168L only)
12	SPF gate solenoid	SGS	Controls the document reverse gate. (AR-168L only)
13	Shifter motor	SFTM	Drives the shifter.

5. Sensors and switches



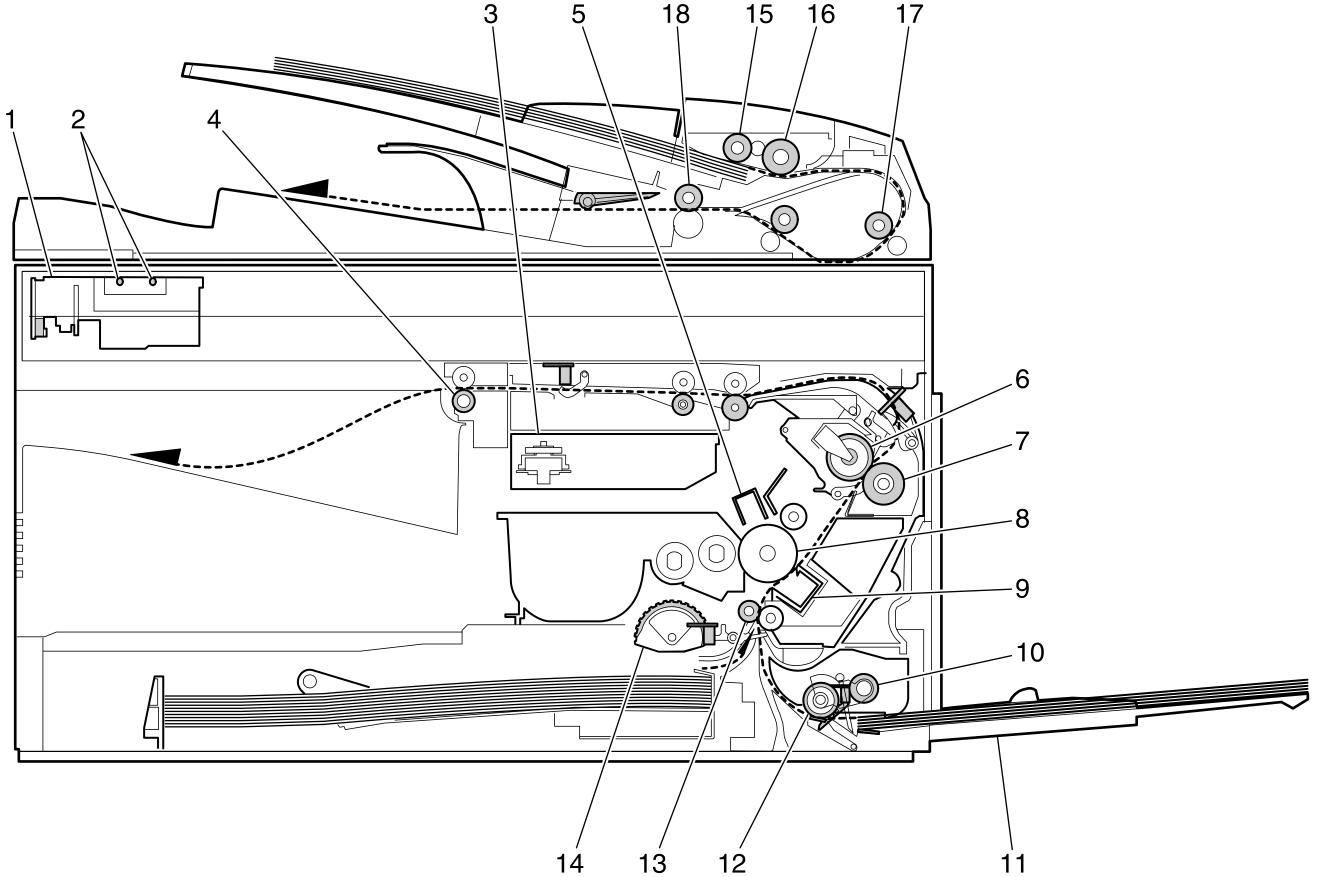
No.	Name	Signal	Type	Function	Output
1	Scanner unit home position sensor	MHPS	Transmission sensor	Scanner unit home position detection	"H" at home position
2	POD sensor	POD	Transmission sensor	Paper exit detection	"H" at paper pass
3	PPD2 sensor	PPD2	Transmission sensor	Paper transport detection 2	"L" at paper pass
4	Cassette detection switch	CED1	Micro-switch	Cassette installation detection	"H" at cassette insertion
5	PPD1 sensor	PPD1	Transmission sensor	Paper transport detection 1	"L" at paper pass
6	Door switch	DSW	Micro-switch	Door open/close detection (safety switch for 24V)	1 or 0V of 24V at door open
7	SPF sensor	SPID/ SD SW	Transmission sensor	Paper entry detection Cover open/close detection	"L" at paper pass
8	SPPD sensor	SPPD	Transmission sensor	Paper transport detection	"L" at paper pass
9	PD1 sensor	PD1	Micro-switch	Paper width detect	"H" at A4 size or less "L" at A4 size or more

6. PWB unit



No.	Name	Function
1	Exposure lamp inverter PWB	Exposure lamp (CCFL) control
2	Main PWB (MCU)	Copier control
3	Operation PWB	Operation input/display
4	Power PWB	AC power input, DC voltage control, High voltage control
5	CCD sensor PWB	For image scanning
6	LSU motor PWB	For polygon motor drive (In the LSU)
7	TCS PWB	For toner sensor control
8	LSU PWB	For laser control (In the LSU)

7. Cross sectional view



No.	Part name	Function and operation
1	Scanner unit	Illuminates the original with the copy lamp and passes the reflected light to the lens unit(CCD).
2	Exposure lamp	Exposure lamp (CCFL) Illuminates original
3	LSU (Laser unit)	Converts the original image signal into laser beams and writes onto the drum.
4	Paper exit roller	Roller for paper exit
5	Main charger	Provides negative charges evenly to the drum surface.
6	Heat roller	Fuses toner on the paper. (Teflon roller)
7	Pressure roller	Fuses toner on the paper. (Silicon rubber roller)
8	Drum	Forms images.
9	Transfer unit	Transfers images onto the drum.
10	Pickup roller	Picks up the manual feed paper. (In multi feed only)
11	Manual paper feed tray	Tray for manual feed paper
12	Manual paper feed roller	Transport the paper from the manual paper feed port.
13	PS roller unit	Takes synchronization between the lead edge and the rear edge of the paper.
14	Paper feed roller	Picks up a sheet of paper from the cassette.
15	Pickup roller	Picks up documents.
16	Separation roller	Separates documents to feed properly.
17	PS roller	Feeds documents to the scanning section.
18	Paper exit roller	Discharges documents.

[5] UNPACKING AND INSTALLATION

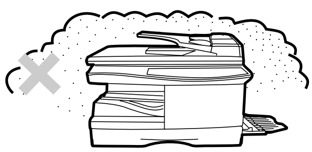
1. Copier installation

Improper installation may damage the copier. Please note the following during initial installation and whenever the copier is moved.

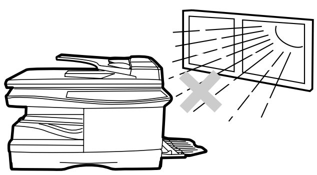
Caution: If the copier is moved from a cool place to a warm place, condensation may form inside the copier. Operation in this condition will cause poor copy quality and malfunctions.
Leave the copier at room temperature for at least 2 hours before use.

Do not install your copier in areas that are:

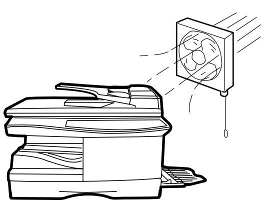
- damp, humid, or very dusty



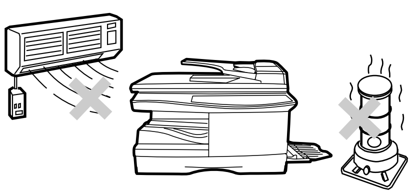
- exposed to direct sunlight



- poorly ventilated



- subject to extreme temperature or humidity changes, e.g., near an air conditioner or heater.

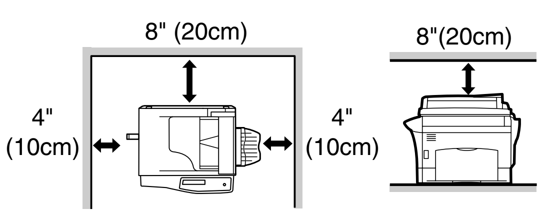


The copier should be installed near an accessible power outlet for easy connection.

Be sure to connect the power cord only to a power outlet that meets the specified voltage and current requirements.

Also make certain the outlet is properly grounded.

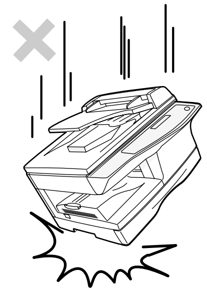
Be sure to allow the required space around the machine for servicing and proper ventilation.



2. Cautions on handling

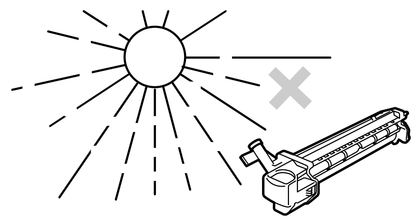
Be careful in handling the copier as follows to maintain the performance of this copier.

Do not drop the copier, subject it to shock or strike it against any object.



Do not expose the drum cartridge to direct sunlight.

Doing so will damage the surface (green portion) of the drum cartridge, causing poor print quality.



Store spare supplies such as drum cartridges and TD cartridges in a dark place without removing from the package before use.

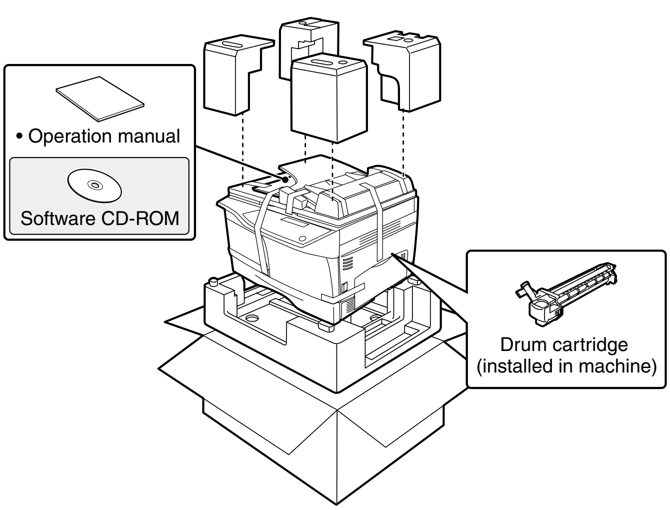
If they are exposed to direct sunlight, poor print quality may result.

Do not touch the surface (green portion) of the drum cartridge.

Doing so will damage the surface of the cartridge, causing poor print quality.

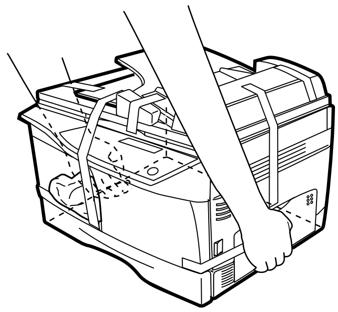
3. Checking packed components and accessories

Open the carton and check if the following components and accessories are included.



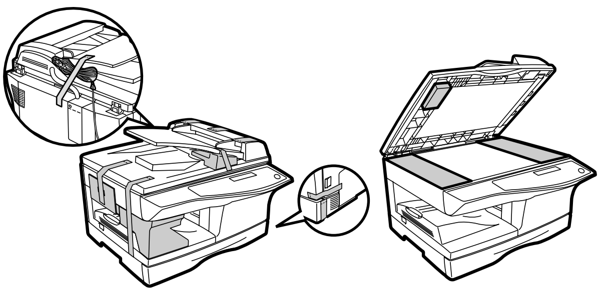
4. Unpacking

Be sure to hold the handles on both sides of the machine to unpack the machine and carry it to the installation location.

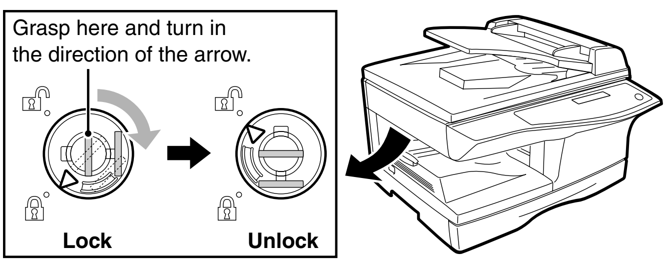


5. Removing protective packing materials

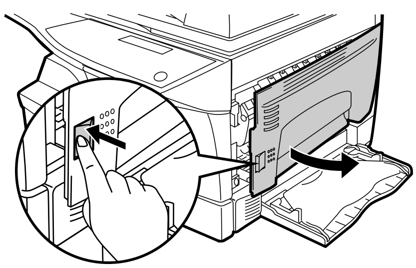
1) Remove all pieces of tape shown in the illustration below and then open the RSPF and remove the protective materials. Take out the bag containing the toner cartridge.



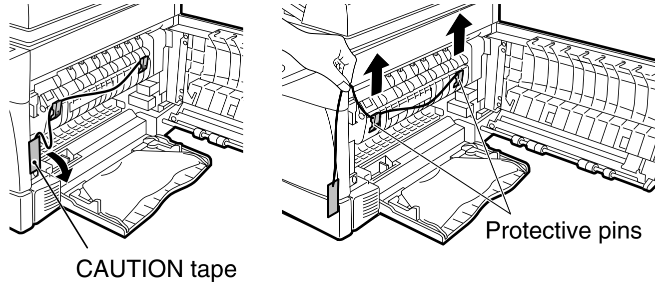
2) Release the scan head locking switch.



3) Open the bypass tray, and then open the side cover while pressing the side cover open button.

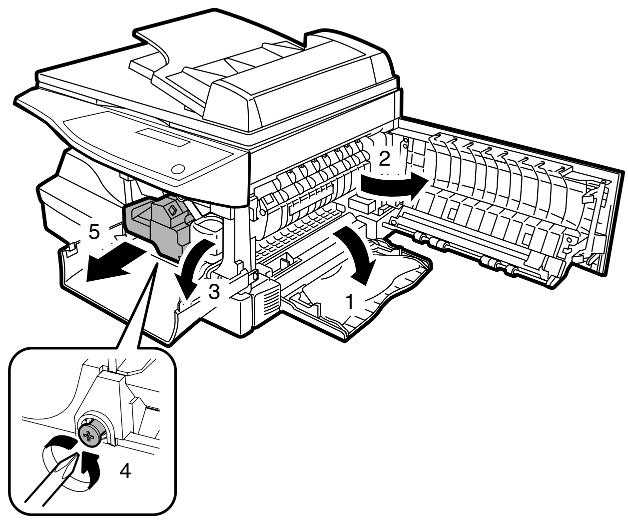


4) Remove the CAUTION tape from the front cover and remove the two protective pins from the fusing machine by pulling the strings upward one at a time.

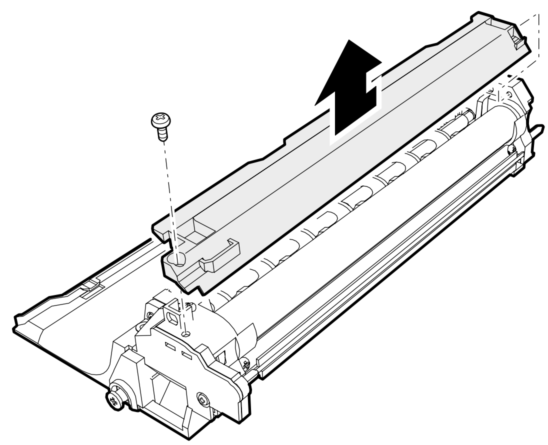


6. Developer unit installation

1) 2) 3) Open the side and front cabinets of the copier.
4) Remove the locking tape of the developer unit.
5) Remove the screw which is fixing the copier and Developer unit.
6) Remove Developer unit slowly from the copier.

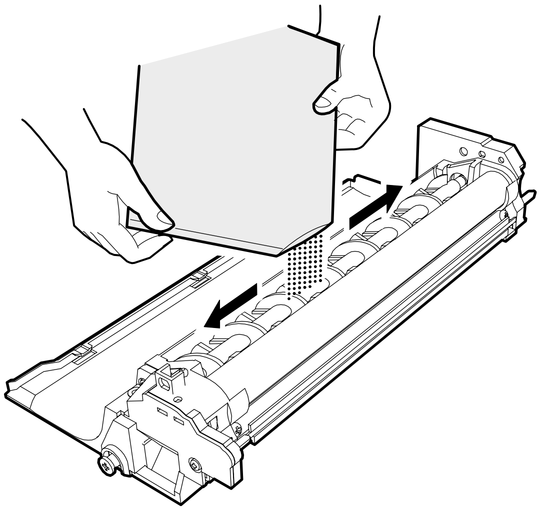


7) Remove the screw (1 pc).
8) Remove Upper developer unit.



9) Shake the aluminum bag to stir developer

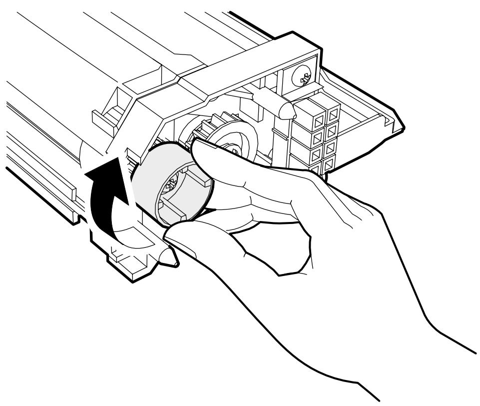
10) Supply developer from the aluminum bag to the top of the MX roller evenly.



Note: Be careful not to splash developer outside Developer unit.

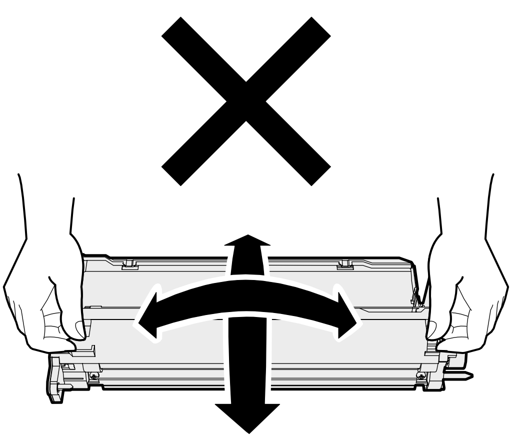
11) Attach Upper developer unit and fix it with a screw.

12) Rotate the MG roller gear to distribute developer evenly.



Note: Never rotate the gear in the reverse direction.

Note: When carrying Developer unit, do not tilt it extremely as shown with the arrow in the figure below. (Prevention of splash of developer)



13) Insert Developer unit carefully into the copier.

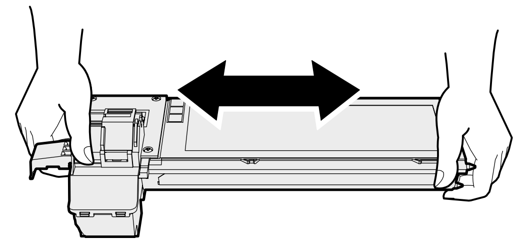
Note: Quick insertion may result in splash of developer. Be sure to insert carefully.

14) Confirm that Developer unit is completely inserted to the bottom of the machine, fix Developer unit and the machine with a screw.

15) Completion of Developer unit installation

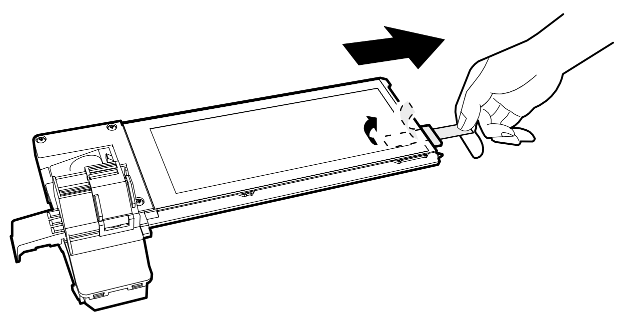
7. Toner cartridge installation

1) To prevent against uneven distribution of toner, hold Toner unit with both hands and shake it several times horizontally.



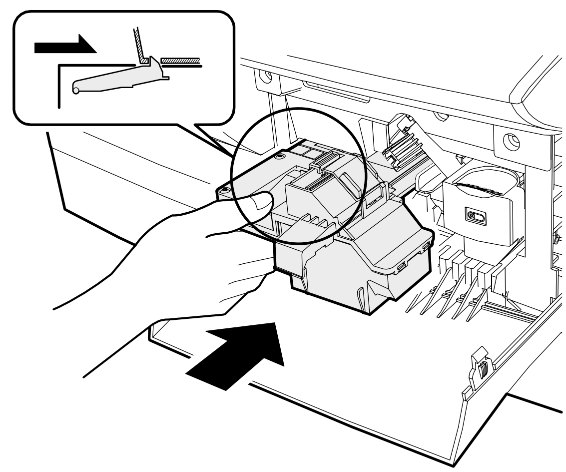
2) Hold the section of Toner unit shown in the figure below, remove the packing tape, and remove the cushion.

3) Pull out the cushion in the arrow direction.

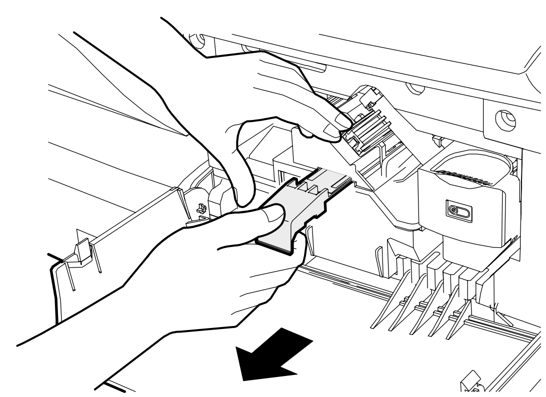


4) Insert Toner unit carefully into the copier.

5) Insert until the hook is engaged with the copier as shown in the figure below.



6) Pull out the shutter in the arrow direction.



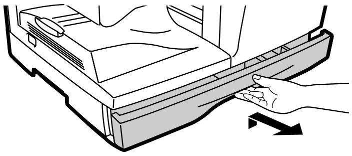
Note: Do not hold and carry the shutter. Otherwise the shutter may drop and Toner unit may drop.

7) Completion of Toner unit installation
Close the front and side cabinets.

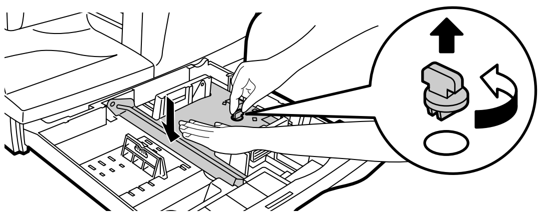
8. Loading the paper tray

Note: Make sure that the paper is not torn, is free of dust, and has no wrinkles or curled edges.

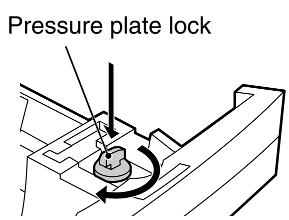
1) Raise the handle of the paper tray and pull the paper tray out until it stops.



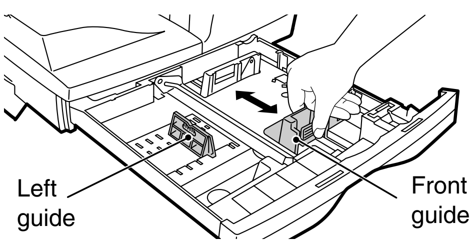
2) Remove the pressure plate lock. Rotate the pressure plate lock in the direction of the arrow to remove it while pressing down on the pressure plate of the paper tray.



3) Store the pressure plate lock which has been removed in step 2. To store the pressure plate lock, rotate the lock to secure it as shown below.



4) Squeeze the lock lever of the front guide and slide the front guide to match the width of the paper, and move the left guide to the appropriate slot as marked on the tray.

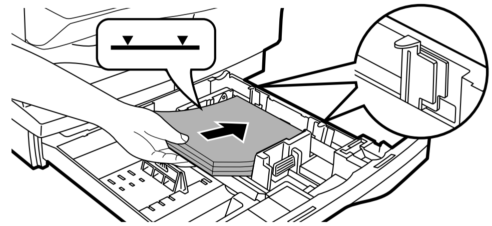


- The front guide is a slide-type guide. Grasp the locking knob on the guide and slide the guide to the indicator line of the paper to be loaded.
- The left guide is an insert-type guide. Remove it and then insert it at the indicator line of the paper to be loaded.

5) Fan the paper and insert it into the tray. Make sure that the edges go under the corner hooks.

Note:

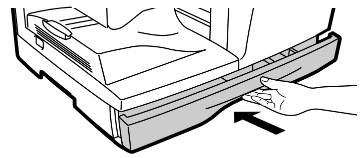
- Do not load paper above the maximum height line (▼▼). Exceeding the line will cause a paper misfeed.
- If the paper is not fanned, double-feeds or misfeeds may occur.
- Make sure the stack of paper is straight before loading it. When adding paper, take the remaining paper out and combine it into a single stack with the new paper.
- Make sure that all the paper in the stack is the same size and type.
- When loading paper, ensure that there is no space between the paper and the guide, and make sure that the guide is not set too narrow and causes the paper to bend. Incorrect loading will cause the paper to skew or misfeed.



6) Gently push the paper tray back into the machine.

Note:

- If you loaded a different size of paper than was loaded previously in the tray.
- When not using the machine for an extended period, remove all paper from the paper tray and store it in a dry place. If paper is left in the machine for an extended period, the paper will absorb moisture from the air, resulting in paper jams.



9. Power to copier

1) Ensure that the power switch of the copier is in the OFF position. Insert the attached power cord into the power cord socket at the rear of the copier.
2) Plug the other end of the power cord into the nearest outlet.

10. Software for AR-168N/168L

The CD-ROM that accompanies the machine contains the following software:

MFP driver

Printer driver

The printer driver enables you to use the printer function of the machine.

The printer driver includes the Print Status Window*. This is a utility that monitors the machine and informs you of the printing status, the name of the document currently being printed, and error messages.

* When the machine is connected through the parallel port, the Print Status Window can only be used when the parallel port is set to ECP mode. To set the parallel port mode, refer to your computer manual or ask the manufacturer of your computer.

Scanner driver (USB only)

The scanner driver allows you to use the scanning function of the machine with TWAIN-compliant and WIA-compliant applications.

Sharpdesk

Sharpdesk is an integrated software environment that makes it easy to manage documents and image files, and launch applications.

Button Manager

Button Manager allows you to use the scanner menus on the machine to scan a document.

Note: The scanning feature can only be used with computers that are running Windows 98/Me/2000/XP and are connected to the machine by a USB cable. If you are running Windows 95/NT 4.0 or are connected to the machine by a parallel connection, only the printer function can be used.

A. Before Installation

(1) Hardware and software requirements

Check the following hardware and software requirements in order to install the software.

Computer type	IBM PC/AT or compatible computer equipped with a USB2.0*1/1.1*2 or bi-directional parallel interface (IEEE1284)
Operating system*3 *4	Windows 95, Windows 98, Windows Me, Windows NT Workstation 4.0 (ServicePack 5 or later)*5, Windows 2000 Professional*5, Windows XP Professional*5, Windows XP Home Edition*5
Display	800 x 600 dots (SVGA) display with 256 colors (or better)
Hard disk free space	150MB or more
Other hardware requirements	An environment on which any of the operating systems listed above can fully operate

*1 The machine's USB connector will transfer data at the speed specified by the USB 2.0 (Hi-Speed) only if the Microsoft USB 2.0 driver is preinstalled in the computer, or if the USB 2.0 driver for Windows 2000 Professional/XP that Microsoft provides through its "Windows Update" is installed.

*2 Compatible with Windows 98, Windows Me, Windows 2000 Professional, Windows XP Professional or Windows XP Home Edition preinstalled model standardly equipped with a USB port.

*3 Printing is not available in MS-DOS mode.

*4 The machine does not support printing from a Macintosh environment.

*5 Administrator's rights are required to install the software using the installer.

(2) Installation environment and usable software

The following table shows the drivers and software that can be installed for each version of Windows and interface connection method.

Cable	Operating system	MFP Driver		Button Manager	Sharpdesk
		Printer driver	Scanner driver		
USB*1	Windows 98/ Me/2000/XP	Available *2	Available		
Parallel	Windows 95/ 98/Me/NT 4.0/ 2000/XP		Not Available*3		

*1 Windows 98/Me does not support USB 2.0. A USB 2.0 connection can be used in Windows 98/Me, however, the performance will be the same as USB 1.1. The print speed based on USB 2.0 specifications can only be attained if your computer is running Windows 2000/XP, you are using a cable that supports USB 2.0 (USB 1.1 or USB 2.0 certified), and the cable is connected to a USB 2.0 port on your computer. If the connection is made through a hub, the hub must support USB 2.0.

*2 The printer driver that is installed will vary depending on the type of connection between the machine and your computer.

*3 Although it is possible to install Button Manager and Sharpdesk on Windows 98/Me/2000/XP, neither Button Manager nor the scanner function of Sharpdesk can actually be used.

B. Installing the software

Note:

- If you need to use a different connection method after installing the software based on a USB or parallel connection, you must first uninstall the software and then install it using the new connection method.
- In the following explanations it is assumed that the mouse is configured for right hand operation.
- The scanner feature only works when using a USB cable.
- If an error message appears, follow the instructions on the screen to solve the problem. After the problem is solved, the installation procedure will continue. Depending on the problem, you may have to click the "Cancel" button to exit the installer. In this case, reinstall the software from the beginning after solving the problem.

[Standard installation (USB only)]

The procedure for a standard installation of the software is explained below. If the machine is connected by a USB cable, it is recommended that you use the standard installation.

Note: The standard installation can only be used when the machine is connected by a USB cable. If the machine is connected by a parallel cable, use the custom installation procedure.

1) The USB cable must not be connected to the machine. Make sure that the cable is not connected before proceeding.

   If the cable is connected, a Plug and Play window will appear. If this happens, click the "Cancel" button to close the window and disconnect the cable.

Note: The cable will be connected in step 9).

2) Insert the CD-ROM into your computer's CD-ROM drive.
3) Click the "start" button, click "My Computer", and then double-click the CD-ROM icon.

   In Windows 98/Me/2000, double-click "My Computer", and then double-click the CD-ROM icon.

4) Double-click the "setup" icon.

Note: If the language selection screen appears after you double click the "setup" icon, select the language that you wish to use and click the "Next" button. (Normally the correct language is selected automatically.)

5) The "SOFTWARE LICENSE" window will appear. Make sure that you understand the contents of the software license, and then click the "Yes" button.
6) Read the "Readme First" in the "Welcome" window and then click the "Next" button.
7) Click the "Standard" button.

   "Integrated Installer is preparing..." will appear and then installation of the MFP driver, Button Manager, and Sharpdesk will begin automatically.

   Follow the on-screen instructions.



8) When the "Finish" screen appears, click the "Close" button.

A message will appear instructing you to connect the machine to your computer. Click the "OK" button.

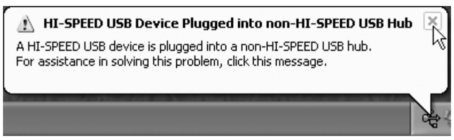
Caution: If you are running Windows 2000/XP and a warning message appears regarding the Windows logo test or digital signature, be sure to click "Continue Anyway" or "Yes".

Note: After the installation, a message prompting you to restart your computer may appear. In this case, click the "Yes" button to restart your computer.

9) Make sure that the power of the machine is turned on, and then connect the USB cable.

Windows will detect the machine and a Plug and Play screen will appear.

Caution: If the following message appears on your computer screen, close it.



A window regarding "HI-SPEED USB Device" will then appear. Close the window.

This message appears when the machine's USB 2.0 mode is not set to "HI-SPEED". For information on switching the USB 2.0 mode.

10) Follow the instructions in the plug and play window to install the MFP driver.

Follow the on-screen instructions.

Caution: If you are running Windows 2000/XP and a warning message appears regarding the Windows logo test or digital signature, be sure to click "Continue Anyway" or "Yes".

Note: A "USB 2.0 Composite Device" installation window may appear prior to this procedure. In this case, follow the instructions in the window to install the USB 2.0 Composite Device.

This completes the installation of the MFP driver.

- If you installed Button Manager, set up Button Manager as explained in "C. SETTING UP BUTTON MANAGER".

[Custom installation]

The procedure for a custom installation of the software is explained below. Use the custom installation procedure when the machine is connected by a parallel cable, when the machine is used as a shared printer on a network, or when you wish to install the MFP driver, Button Manager, or Sharpdesk separately.

(1) Windows XP (USB/Parallel)

1) The USB/parallel cable must not be connected to the machine. Make sure that the cable is not connected before proceeding.

If the cable is connected, a Plug and Play window will appear. If this happens, click the "Cancel" button to close the window and disconnect the cable.

Note: The cable will be connected in step 14).

2) Insert the CD-ROM into your computer's CD-ROM drive.

3) Click the "start" button, click "My Computer", and then double-click the CD-ROM icon.

In Windows 98/Me/2000, double-click "My Computer", and then double-click the CD-ROM icon.

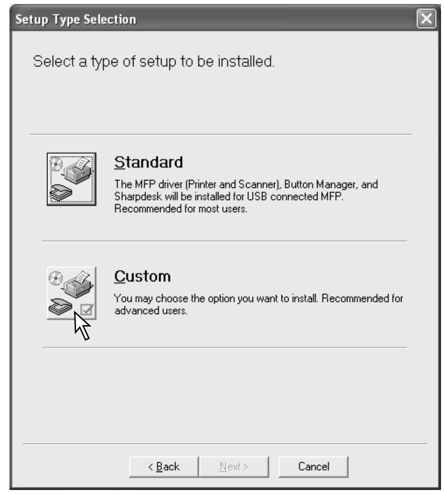
4) Double-click the "setup" icon.

Note: If the language selection screen appears after you double click the "setup" icon, select the language that you wish to use and click the "Next" button. (Normally the correct language is selected automatically.)

5) The "SOFTWARE LICENSE" window will appear. Make sure that you understand the contents of the software license, and then click the "Yes" button.

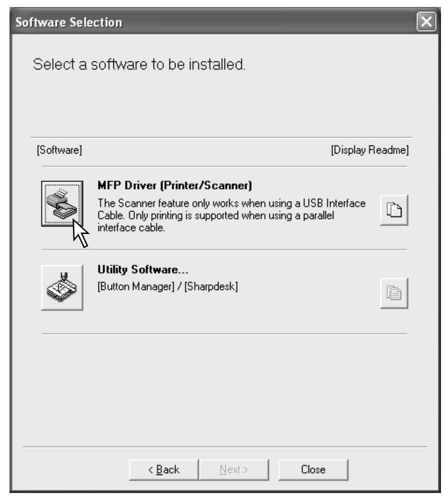
6) Read the "Readme First" in the "Welcome" window and then click the "Next" button.

7) Click the "Custom" button.



8) Click the "MFP Driver" button.

To view detailed information on the software, click the "Display Readme" button.

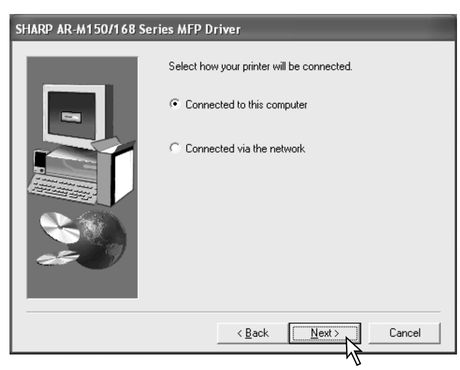


9) The "Welcome" window will appear. Click the "Next" button.

10) When you are asked how the printer is connected, select "Connected to this computer" and click the "Next" button.

If you are using the machine as a shared printer on a network, select "Connected via the network". For more information on this setting, see "Using the machine as a shared printer".

Follow the on-screen instructions.



Caution: If you are running Windows XP and a warning message appears regarding the Windows logo test or digital signature, be sure to click "Continue Anyway".

11) You will return to the window of step 8). If you wish to install Button Manager or Sharpdesk, click the "Utility Software" button.

If you do not wish to install the Utility Software, click the "Close" button and go to step 14).

Note: After the installation, a message prompting you to restart your computer may appear. In this case, click the "Yes" button to restart your computer.

Installing the Utility Software

12) Click the "Button Manager" button.

To view detailed information on the software, click the "Display Readme" button.

Follow the on-screen instructions.

If you wish to install Sharpdesk, click the "Sharpdesk" button in this window and follow the on-screen instructions.

Caution:

- Button Manager can only be used when the machine is connected by a USB cable.
- The scanner function of Sharpdesk can only be used when the machine is connected by a USB cable.



Caution: If the following screen appears during installation of Sharpdesk, click the "Skip" button or the "Continue" button as appropriate to continue the Sharpdesk installation.



If "Skip" is selected, the Sharpdesk installation will continue without installing Sharpdesk imaging.

If "Continue" is selected, Sharpdesk Imaging will be installed. If Imaging for Windows is installed on your computer, Sharpdesk Imaging will overwrite Imaging for Windows.

13) When installation of Button Manager is finished, you will return to the window of step 12). Click the "Close" button.

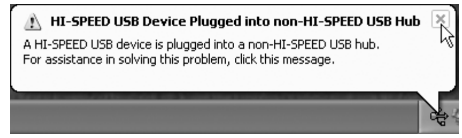
A message will appear instructing you to connect the machine to your computer. Click the "OK" button.

Note: After the installation, a message prompting you to restart your computer may appear. In this case, click the "Yes" button to restart your computer.

14) Make sure that the power of the machine is turned on, and then connect the USB/parallel cable.

Windows will detect the machine and a Plug and Play screen will appear.

Caution: If the following message appears on your computer screen, close it.



A window regarding "HI-SPEED USB Device" will then appear. Close the window.

This message appears when the machine's USB 2.0 mode is not set to "HI-SPEED". For information on switching the USB 2.0 mode.

15) Follow the instructions in the plug and play window to install the MFP driver.

Follow the on-screen instructions.

Caution: If you are running Windows XP and a warning message appears regarding the Windows logo test or digital signature, be sure to click "Continue Anyway".

Note: A "USB 2.0 Composite Device" installation window may appear prior to this procedure. In this case, follow the instructions in the window to install the USB 2.0 Composite Device.

This completes the installation of the MFP driver.

- If you installed Button Manager, set up Button Manager as explained in "C. Setting up button manager".

(2) Windows 98/Me/2000 (USB)

1) The USB cable must not be connected to the machine. Make sure that the cable is not connected before proceeding.

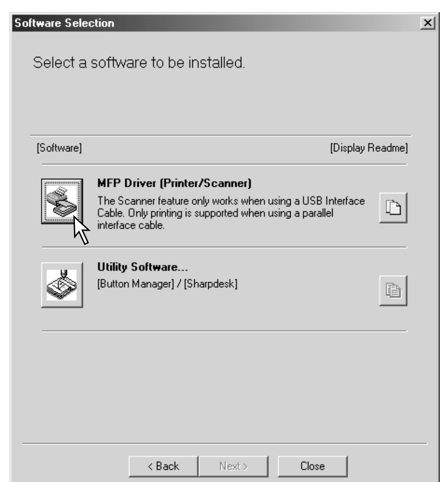
If the cable is connected, a Plug and Play window will appear. If this happens, click the "Cancel" button to close the window and disconnect the cable.

Note: The cable will be connected in step 8).

2) Perform steps 2) through 7) in "Custom installation".

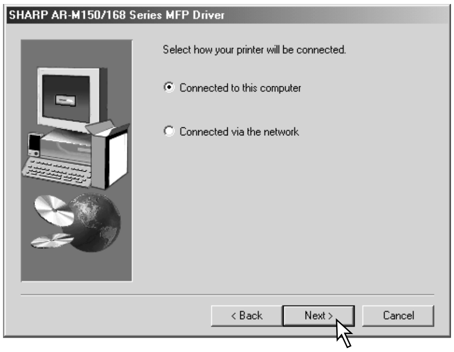
3) Click the "MFP Driver" button.

To view detailed information on the software, click the "Display Readme" button.



4) The "Welcome" window will appear. Click the "Next" button.

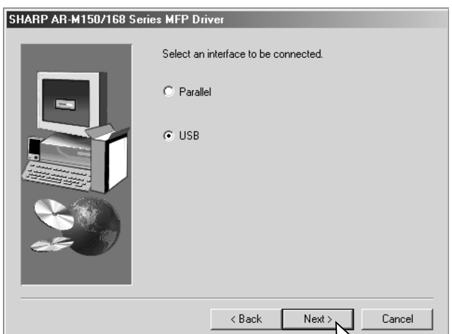
5) When you are asked how the printer is connected, select "Connected to this computer" and click the "Next" button.



6) When the interface selection screen appears, select "USB" and click the "Next" button.

If you are using the machine as a shared printer on a network, select "Connected via the network". For more information on this setting, see "Using the machine as a shared printer".

Follow the on-screen instructions.



Caution: If you are running Windows 2000 and a warning message appears regarding the Windows logo test or digital signature, be sure to click "Yes".

7) You will return to the window of step 3). If you wish to install Button Manager or Sharpdesk, click the "Utility Software" button.

To install the Utility Software, see "Installing the Utility Software" (steps 12) and 13) on page 7).

If you do not wish to install the Utility Software, click the "Close" button.

A message will appear instructing you to connect the machine to your computer. Click the "OK" button.

Note: After the installation, a message prompting you to restart your computer may appear. In this case, click the "Yes" button to restart your computer.

8) Make sure that the power of the machine is turned on, and then connect the USB cable.

Windows will detect the machine and a Plug and Play screen will appear.

9) Follow the instructions in the plug and play window to install the MFP driver.

Follow the on-screen instructions.

Caution: If you are running Windows 2000 and a warning message appears regarding the Windows logo test or digital signature, be sure to click "Yes".

Note: A "USB 2.0 Composite Device" installation window may appear prior to this procedure. In this case, follow the instructions in the window to install the USB 2.0 Composite Device.

This completes the installation of the MFP driver.

- If you installed Button Manager, set up Button Manager as explained in "C. Setting up button manager".

(3) Windows 95/98/Me/NT 4.0/2000 (Parallel)

1) The parallel cable must not be connected to the machine. Make sure that the cable is not connected before proceeding.

If the cable is connected, a Plug and Play window will appear. If this happens, click the "Cancel" button to close the window and disconnect the cable.

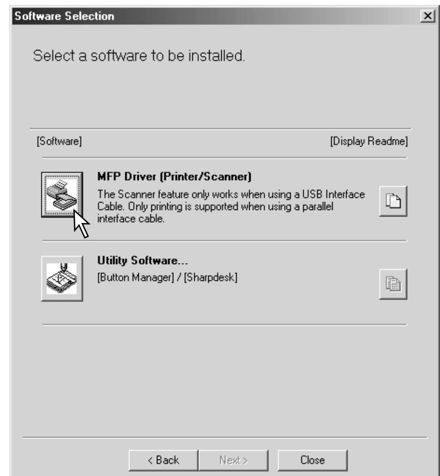
Note: The cable will be connected in step 10).

2) Perform steps 2) through 7) in "Custom installation".

3) Click the "MFP Driver" button.

To view detailed information on the software, click the "Display Readme" button.

Note: In Windows 95/NT4.0, the "Utility Software" button does not appear and only the printer driver can be installed.



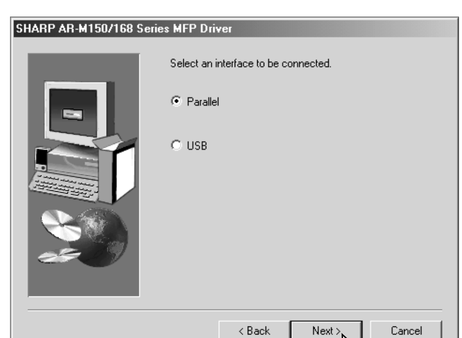
4) The "Welcome" window will appear. Click the "Next" button.

5) When you are asked how the printer is connected, select "Connected to this computer" and click the "Next" button.

If you are using the machine as a shared printer on a network, select "Connected via the network". For more information on this setting, see "Using the machine as a shared printer".

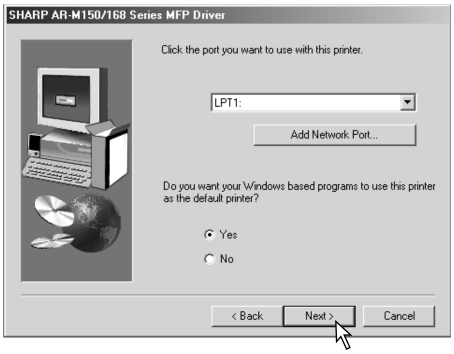


6) When the interface selection screen appears, select "Parallel" and click the "Next" button.



7) Select the printer port and whether the machine is to be used as the default printer, make the selections and click the "Next" button.

Select "LPT1" for the printer port.



Note:

- If "LPT1" does not appear, another printer or peripheral device is using LPT1. In this case continue the installation, and after the installation is finished, change the port setting so that the machine can use LPT1.
- The "Add Network port" button is used when the machine is used as a shared printer. Do not click this button here.

8) When the model selection window appears, select model name of your machine and click the "Next" button.

Follow the on-screen instructions.

Caution: If you are running Windows 2000 and a warning message appears regarding the Windows logo test or digital signature, be sure to click "Yes".

9) You will return to the window of step 3). If you wish to install Sharpdesk, click the "Utility Software" button.

To install the Utility Software, see "Installing the Utility Software" (steps 12) and 13) on page 7).

If you do not wish to install the Utility Software, click the "Close" button.

A message will appear instructing you to connect the machine to your computer. Click the "OK" button.

10) Make sure that the power of the machine is turned on, and then connect the parallel cable.

This completes the installation of the MFP driver.

(4) Using the machine as a shared printer

If the machine will be used as a shared printer on a network, follow these steps to install the MFP driver in the client computer.

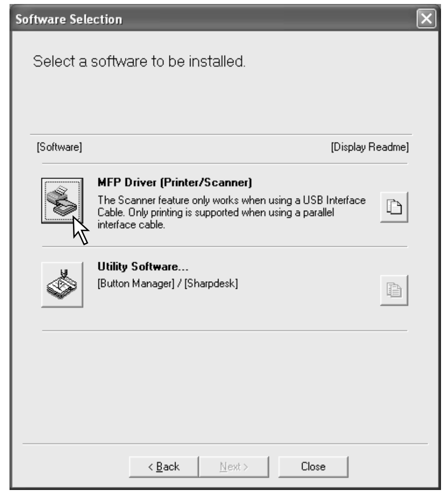
Note:

- To configure the appropriate settings in the print server, see the operation manual or help file of your operating system.
  "Print server" as explained here is a computer that is directly connected to the machine, and a "Client" is any other computer that is connected to the same network.
- When the machine is used via a network connection, only the printer function can be used; the scanner function cannot be used.

1) Perform steps 2) through 7) in "Custom installation".

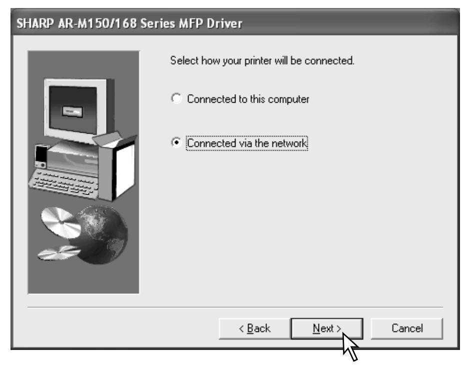
2) Click the "MFP Driver" button.

To view detailed information on the software, click the "Display Readme" button.

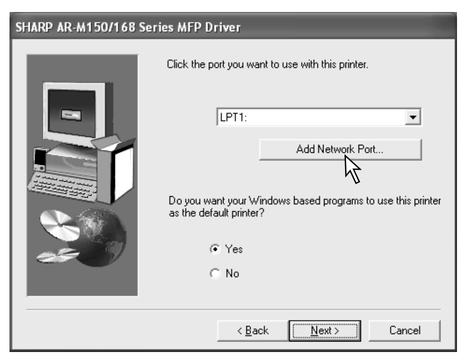


3) The "Welcome" window will appear. Click the "Next" button.

4) When you are asked how the printer is connected, select "Connected via the network" and click the "Next" button.

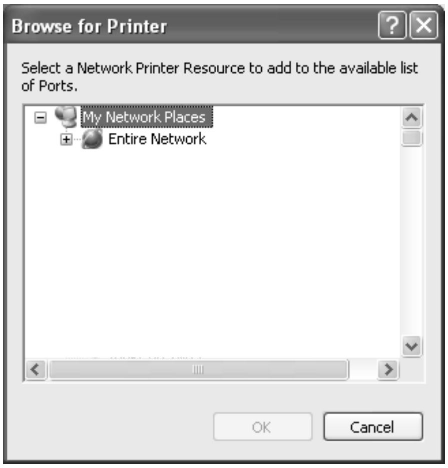


5) When you are asked to select the printer port to be used, click the "Add Network Port" button.



6) Select the network printer that is shared and click the "OK" button.

Ask your network administrator for the server name and printer name of the machine on the network.



7) In the printer port selection window, verify the network printer that is shared and whether the machine is to be used as the default printer, make the selections and click the "Next" button.
8) When you are asked to select the model name, select the model that you are using and click the "Next" button.

Follow the on-screen instructions.

Caution: If you are running Windows 2000/XP and a warning message appears regarding the Windows logo test or digital signature, be sure to click "Continue Anyway" or "Yes".

9) You will return to the window of step 2). Click the "Close" button.

Note: After the installation, a message prompting you to restart your computer may appear. In this case, click the "Yes" button to restart your computer.

This completes the installation of the MFP driver.

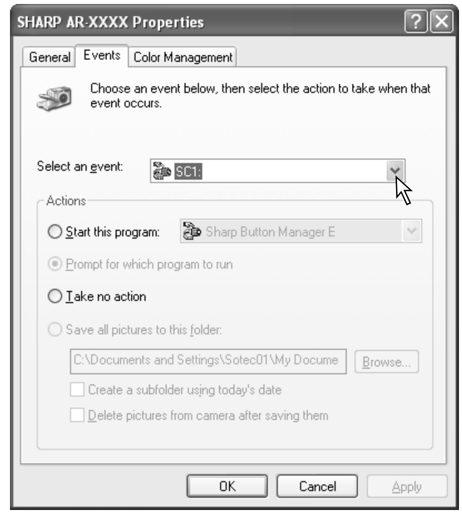
C. Setting up button manager

Button Manager is a software program that works with the scanner driver to enable scanning from the machine.

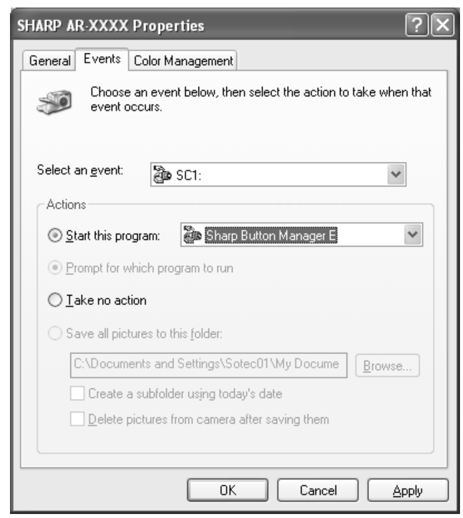
To scan using the machine, Button Manager must be linked with the scan menu on the machine. Follow the steps below to link Button Manager to scanner events.

(1) Windows XP

1) Click the "start" button, click "Control Panel", click "Printers and Other Hardware", and then click "Scanners and Cameras".
2) Click the "SHARP AR-XXXX" icon and select "Properties" from the "File" menu.
3) In the "Properties" screen, click the "Events" tab.
4) Select "SC1:" from the "Select an event" pull-down menu.



5) Select "Start this program" and then select "Sharp Button Manager E" from the pull-down menu.



6) Click the "Apply" button.
7) Repeat Steps 4) through 6) to link Button Manager to "SC2:" through "SC6:".

Select "SC2:" from the "Select an event" pull-down menu. Select "Start this program", select "Sharp Button Manager E" from the pull-down menu, and then click the "Apply" button. Do the same for each ScanMenu through "SC6:".

When the settings have been completed, click the "OK" button to close the screen.

Button Manager is now linked to the scan menu (1 through 6).

The scan settings for each of scan menu 1 through 6 can be changed with the setting window of Button Manager.

For the factory default settings of the scan menu and the procedures for configuring Button Manager settings.

(2) Windows 98/Me/2000

1) Click the "Start" button, select "Settings", and then click "Control Panel".
2) Double-click the "Scanners and Cameras" icon.

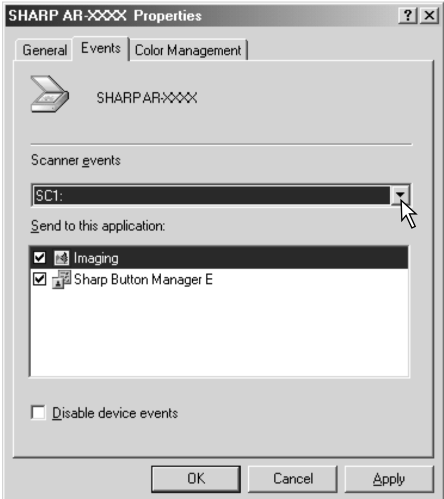
Note: If the "Scanners and Cameras" icon does not appear in Windows Me, click "view all Control Panel options".

3) Select "SHARP AR-XXXX" and click the "Properties" button.

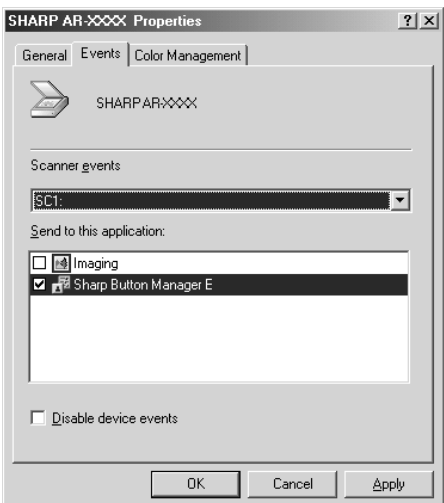
In Windows Me, right click "SHARP AR-XXXX" and click "Properties" in the pop-up menu.

4) In the "Properties" screen, click the "Events" tab.

5) Select "SC1:" from the "Scanner events" pull-down menu.



6) Select "Sharp Button Manager E" in "Send to this application".



Note: If other applications are shown, deselect the checkboxes for the other applications and leave only the Button Manager checkbox selected.

7) Click the "Apply" button.

8) Repeat Steps 5) through 7) to link Button Manager to "SC2:" through "SC6:".

   Select "SC2:" from the "Scanner events" pull-down menu. Select "Sharp Button Manager E" in "Send to this application" and click the "Apply" button. Do the same for each ScanMenu through "SC6:".

   When the settings have been completed, click the "OK" button to close the screen.

Button Manager is now linked to the scan menu (1 through 6).

The scan settings for each of scan menus 1 through 6 can be changed with the setting window of Button Manager.

For the factory default settings of the scan menu and the procedures for configuring Button Manager settings.

D. Connecting the machine to your computer

(1) Connecting a USB cable

Follow the procedure below to connect the machine to your computer.

A USB cable for connecting the machine to your computer is not included with the machine. Please purchase the appropriate cable for your computer.

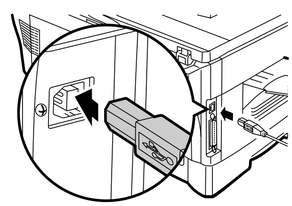
Caution:

- USB is available with a PC/AT compatible computer that was originally equipped with USB and had Windows 98, Windows Me, Windows 2000 Professional, Windows XP Professional or Windows XP Home Edition preinstalled.
- Do not connect the USB cable before installing the MFP driver. The USB cable should be connected during installation of the MFP driver.

Note:

- If the machine will be connected using a USB 2.0 port of your computer, please purchase a USB cable that supports USB 2.0.
- The machine's USB connector will transfer data at the speed specified by the USB 2.0 (Hi-Speed) only if the Microsoft USB 2.0 driver is preinstalled in the computer, or if the USB 2.0 driver for Windows 2000 Professional/XP that Microsoft provides through its "Windows Update" Web page is installed.
- To obtain the fastest USB 2.0 data transfer speed, "USB2.0 MODE SWITCH" in the machine's user programs must be set to "HI-SPEED".
- Use the machine's "HI-SPEED" mode only when using a computer that is running Windows 2000/XP.
- Even when the Microsoft USB 2.0 driver is used, it may not be possible to obtain full USB 2.0 speed if a PC card supporting USB 2.0 is used. To obtain the latest driver (which may enable a higher speed), contact the manufacturer of your PC card.
- Connection is also possible using a USB 1.1 port on your computer. However, the specifications will be USB 1.1 specifications (Full-Speed).

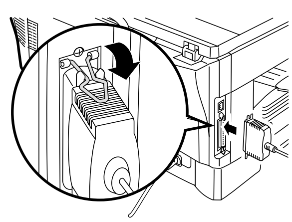
1) Insert the cable into the USB connector on the machine.



2) Insert the other end of the cable into your computer's USB port.

(2) Connecting a parallel cable

1) Obtain an IEEE1284 shielded parallel interface cable.
2) Insert the cable into the parallel interface connector located on the rear of the unit, and fasten with clasps.



3) Insert the other end of the cable into the interface connector of your computer.

11. Interface

A. USB

Connector

4-pin ACON UBR23-4K2200

Type-B connector

Cable

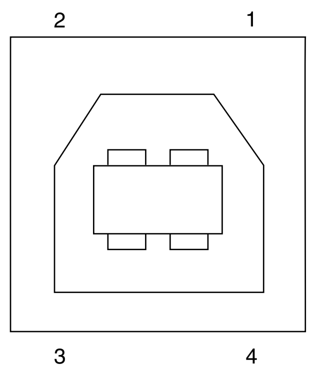
Shielded twisted pair cable

(2 m (6 feet) Max.: high-speed transmission equivalent)

Pin configuration

The pin numbers and signal names are listed in the following table.

Pin No.	Signal name
1	+5V
2	-DATA
3	+DATA
4	GND



B. Parallel interface

This printer uses a bi-directional parallel interface. Use the supplied interface cable.

Connector

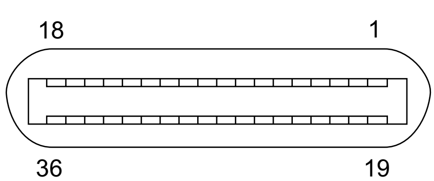
36-pin ACON RBE42-36K1153 female connector or equivalent connector

Cable

Shielded type bi-directional parallel interface For best results, use a printer interface cable which is IEEE1284 compliant.

Pin configuration

The pin numbers and signal names are listed in the following table.



Pin No.	Signal name	Pin No.	Signal name
1	$\overline{\text{STB}}$	19	GND (STB RET)
2	DATA1	20	GND (DATA1 RET)
3	DATA2	21	GND (DATA2 RET)
4	DATA3	22	GND (DATA3 RET)
5	DATA4	23	GND (DATA4 RET)
6	DATA5	24	GND (DATA5 RET)
7	DATA6	25	GND (DATA6 RET)
8	DATA7	26	GND (DATA7 RET)
9	DATA8	27	GND (DATA8 RET)
10	$\overline{\text{ACKNLG}}$	28	GND ($\overline{\text{ACKNLG}}$ RET)
11	BUSY	29	GND (BUSY RET)
12	PE (Paper End)	30	GND (PE RET)
13	SLTC	31	INPRM
14	$\overline{\text{AUTO LF}}$	32	$\overline{\text{FAULT}}$
15	(NC)	33	(NC)
16	GND (0 V)	34	(NC)
17	FG	35	+5 V
18	+5 V	36	$\overline{\text{SLTC IN}}$

12. Moving

Moving instructions

When moving the unit, follow the procedure below.

Note: When moving this unit, be sure to remove the TD cartridge in advance.

1) Turn the power switch off and remove the power cord from the outlet.
2) Open the side cover and front cover, in that order. Remove the TD cartridge and close the front cover and side cover, in that order.

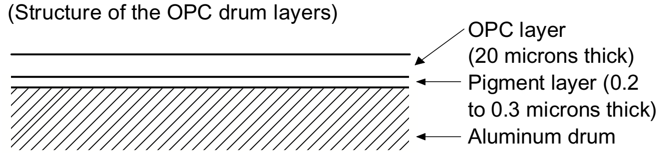
   To open and close the side cover and front cover, and to remove the TD cartridge.
3) Raise the handle of the paper tray and pull the paper tray out until it stops.
4) Push the center of the pressure plate down until it locks in place and lock the plate using the pressure plate lock which has been stored in the front of the paper tray.
5) Push the paper tray back into the unit.
6) Lock the scan head locking switch.

Note: When shipping the unit, the scan head locking switch must be locked to prevent shipping damage.

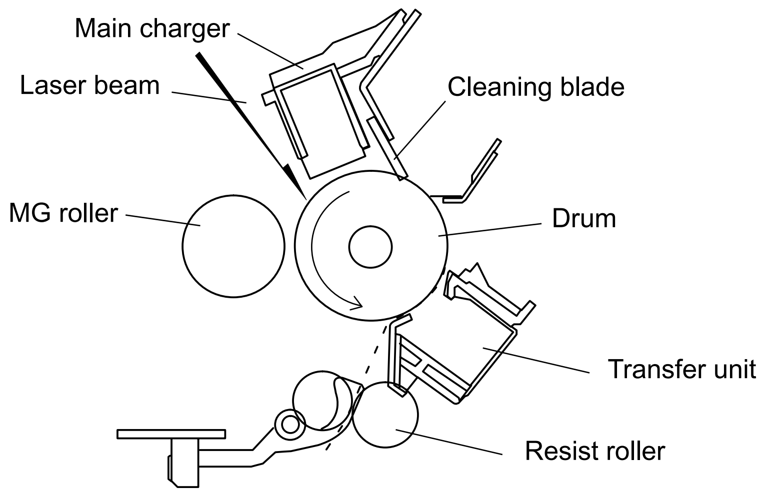
7) Close the multi-bypass tray and the paper output tray extension, and attach the packing materials and tape which were removed during installation of the unit.
8) Pack the unit into the carton.

[6] COPY PROCESS

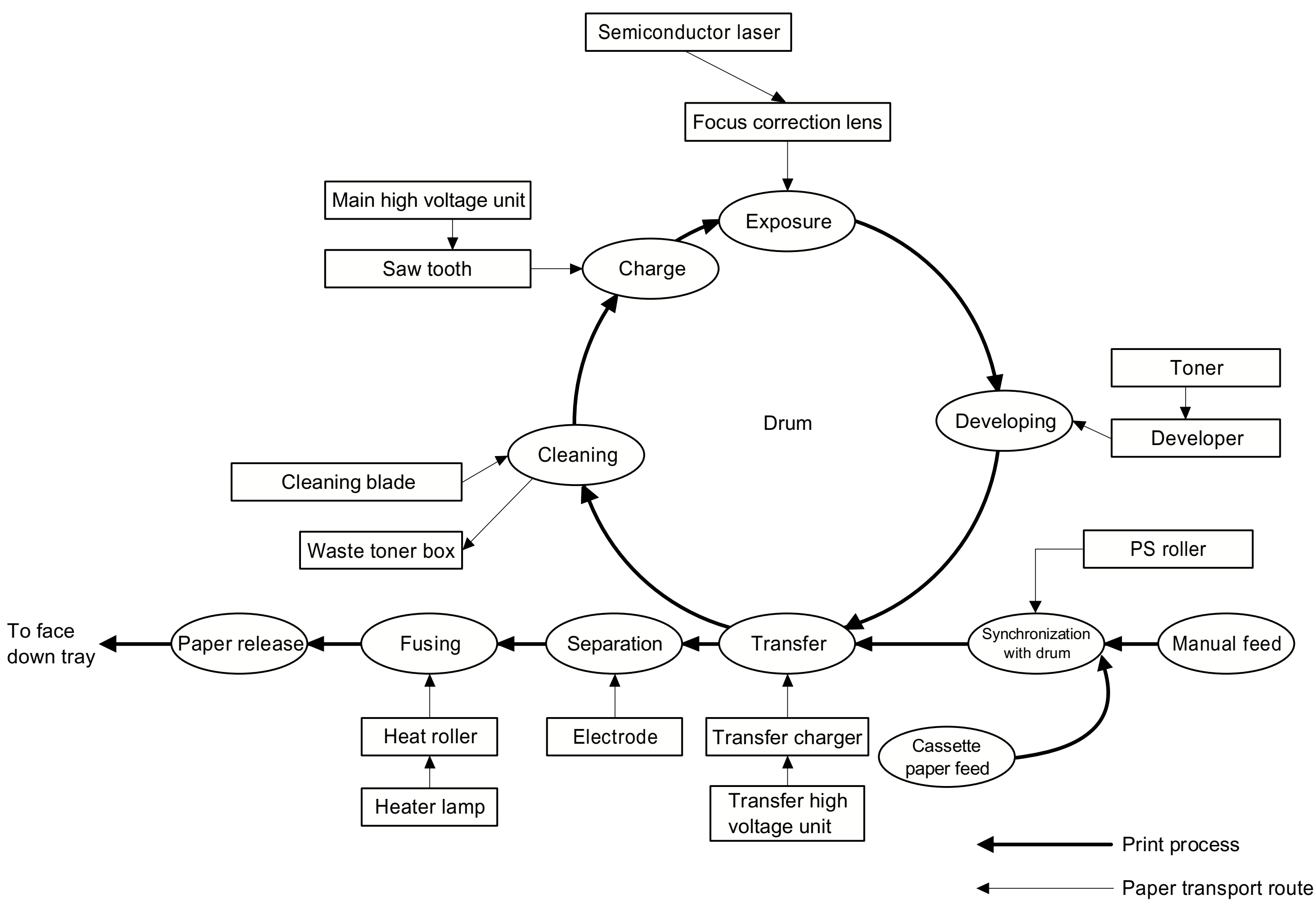
An OPC drum is used for the photoconductor.
(Structure of the OPC drum layers)



1. Functional diagram



(Basic operation cycle)



2. Outline of print process

This printer is a non-impact printer that uses a semiconductor laser and electrostatic print process. This printer uses an OPC (Organic Photo Conductor) for its photoconductive material.
First, voltage from the main corona unit charges the drum surface and a latent image is formed on the drum surface using a laser beam. This latent image forms a visible image on the drum surface when toner is applied. The toner image is then transferred onto the print paper by the transfer corona and fused on the print paper in the fusing section with a combination of heat and pressure.

Step-1: Charge
Step-2: Exposure
* Latent image is formed on the drum.

Step-3: Developing
Latent image formed on the drum is then changed into visible image with toner.

Step-4: Transfer
The visible image (toner image) on the drum is transferred onto the print paper.

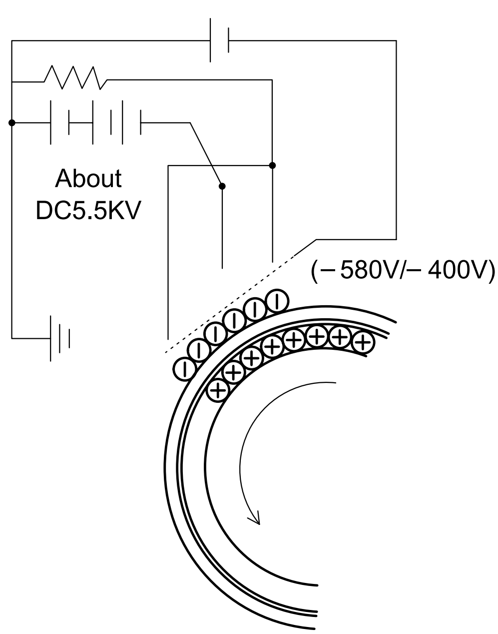
Step-5: Cleaning
Residual toner on the drum surface is removed and collected by the cleaning blade.

Step-6: Optical discharge
Residual charge on the drum surface is removed, by semiconductor laser beam.

3. Actual print process

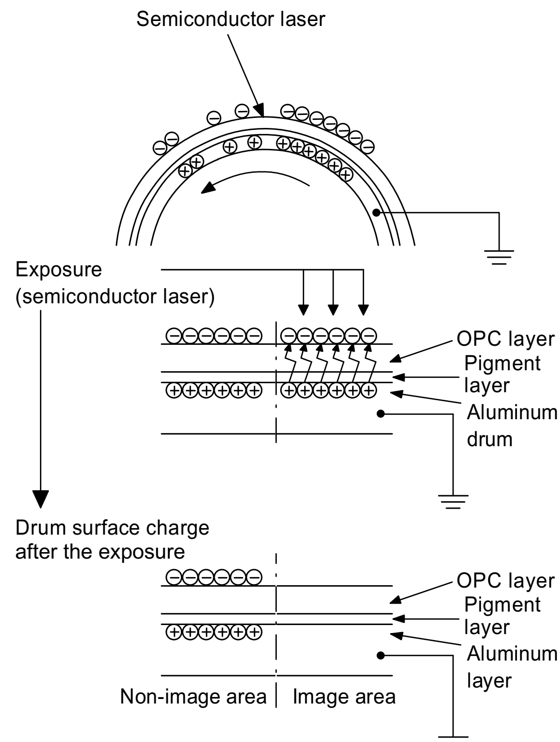
Step-1: DC charge

A uniform negative charge is applied over the OPC drum surface by the main charging unit. Stable potential is maintained by means of the Scorotron charger.
Positive charges are generated in the aluminum layer.



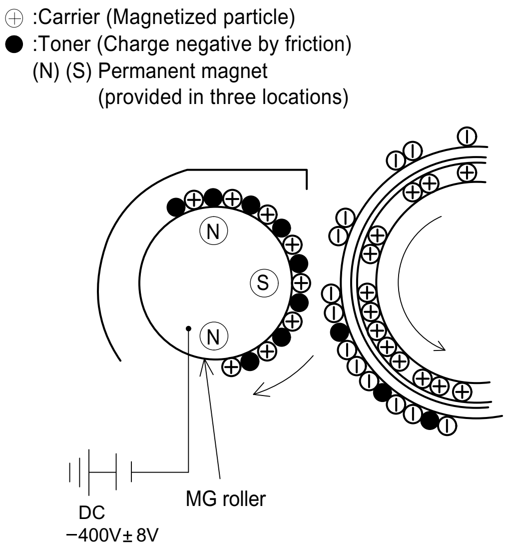
Step-2: Exposure (laser beam, lens)

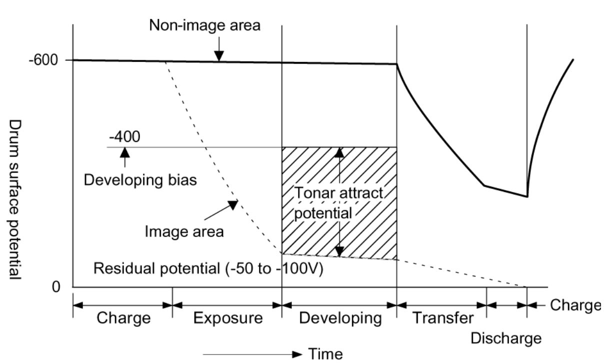
A Laser beam is generated from the semiconductor laser and controlled by the print pattern signal. The laser writes onto the OPC drum surface through the polygon mirrors and lens. The resistance of the OPC layer decreases for an area exposed by the laser beam (corresponding to the print pattern signal). The beam neutralizes the negative charge. An electrostatic latent image is formed on the drum surface.



Step-3: Developing (DC bias)

A bias potential is applied to the MG roller in the two component magnetic brush developing method, and the toner is charged negative through friction with the carrier.
Non-image area of the drum surface charged with negative potential repel the toner, whereas the laser exposed portions where no negative charges exist, attract the toner. As a result, a visible image appears on the drum surface.

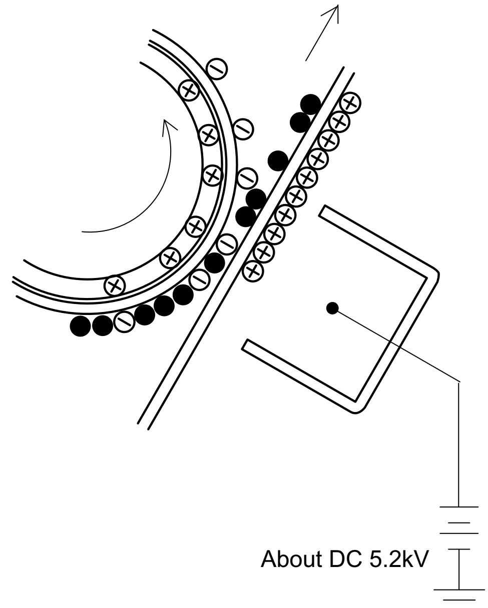




Toner is attracted over the shadowed area because of the developing bias.

Step-4: Transfer

The visible image on the drum surface is transferred onto the print paper by applying a positive charge from the transfer corona to the backside of the print paper.

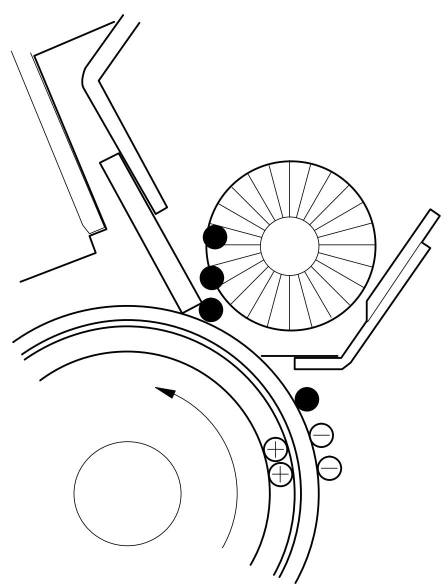


Step-5: Separation

Since the print paper is charged positively by the transfer corona, it is discharged by the separation corona. The separation corona is connected to ground.

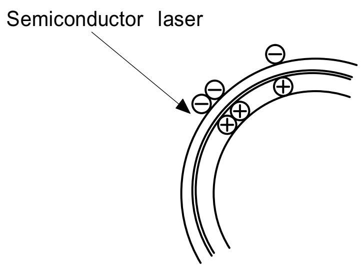
Step-6: Cleaning

Toner remaining on the drum is removed and collected by the cleaning blade. It is transported to the waste toner collecting section in the cleaning unit by the waste toner transport roller.



Step-7: Optical discharge (Semiconductor laser)

Before the drum rotation is stopped, the semiconductor laser is radiated onto the drum to reduce the electrical resistance in the OPC layer and eliminate residual charge, providing a uniform state to the drum surface for the next page to be printed.
When the electrical resistance is reduced, positive charges on the aluminum layer are moved and neutralized with negative charges on the OPC layer.



Charge by the Scorotron charger

Function

The Scorotron charger functions to maintain uniform surface potential on the drum at all times, It control the surface potential regardless of the charge characteristics of the photoconductor.

Basic function

A screen grid is placed between the saw tooth and the photoconductor. A stable voltage is added to the screen grid to maintain the corona current on the photoconductor.
As the photoconductor is charged by the saw tooth from the main corona unit, the surface potential increases. This increases the current flowing through the screen grid. When the photoconductor potential nears the grid potential, the current turns to flow to the grid so that the photoconductor potential can be maintained at a stable level.

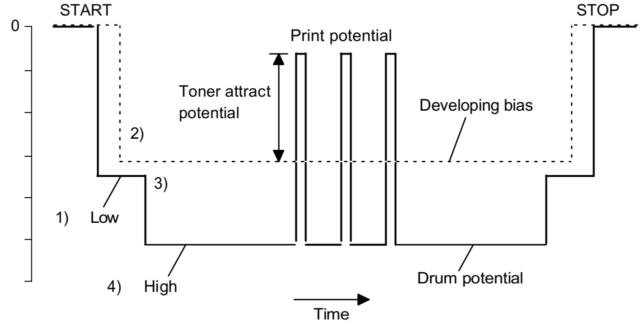
Process controlling

Function

The print pattern signal is converted into an invisible image by the semiconductor laser using negative to positive (reversible) developing method. Therefore, if the developing bias is added before the drum is charged, toner is attracted onto the drum. If the developing bias is not added when the drum is charged, the carrier is attracted to the drum because of the strong electrostatic force of the drum.
To avoid this, the process is controlled by adjusting the drum potential and the grid potential of the Scorotron charger.

Basic function

Voltage added to the screen grid can be selected, high and low. To make it easily understood, the figure below shows voltage transition at the developer unit.



Start

1) Because the grid potential is at a low level, the drum potential is at about -400V. (Carrier may not be attracted though the carrier is pulled towards the drum by the electrostatic force of -400V.
2) Developing bias (-400V) is applied when the photoconductor potential is switched from LOW to HIGH.
3) Once developing bias (-400V) is applied and the photo conductor potential rises to HIGH, toner will not be attracted to the drum.

Stop

The reverse sequence takes place.
Retaining developing bias at an abnormal occurrence

Function

The developing bias will be lost if the power supply was removed during print process. In this event, the drum potential slightly abates and the carrier makes deposits on the drum because of strong static power. To prevent this, the machine incorporates a function to retain the developing bias for a certain period and decrease the voltage gradually against possible power loss.

Basic function

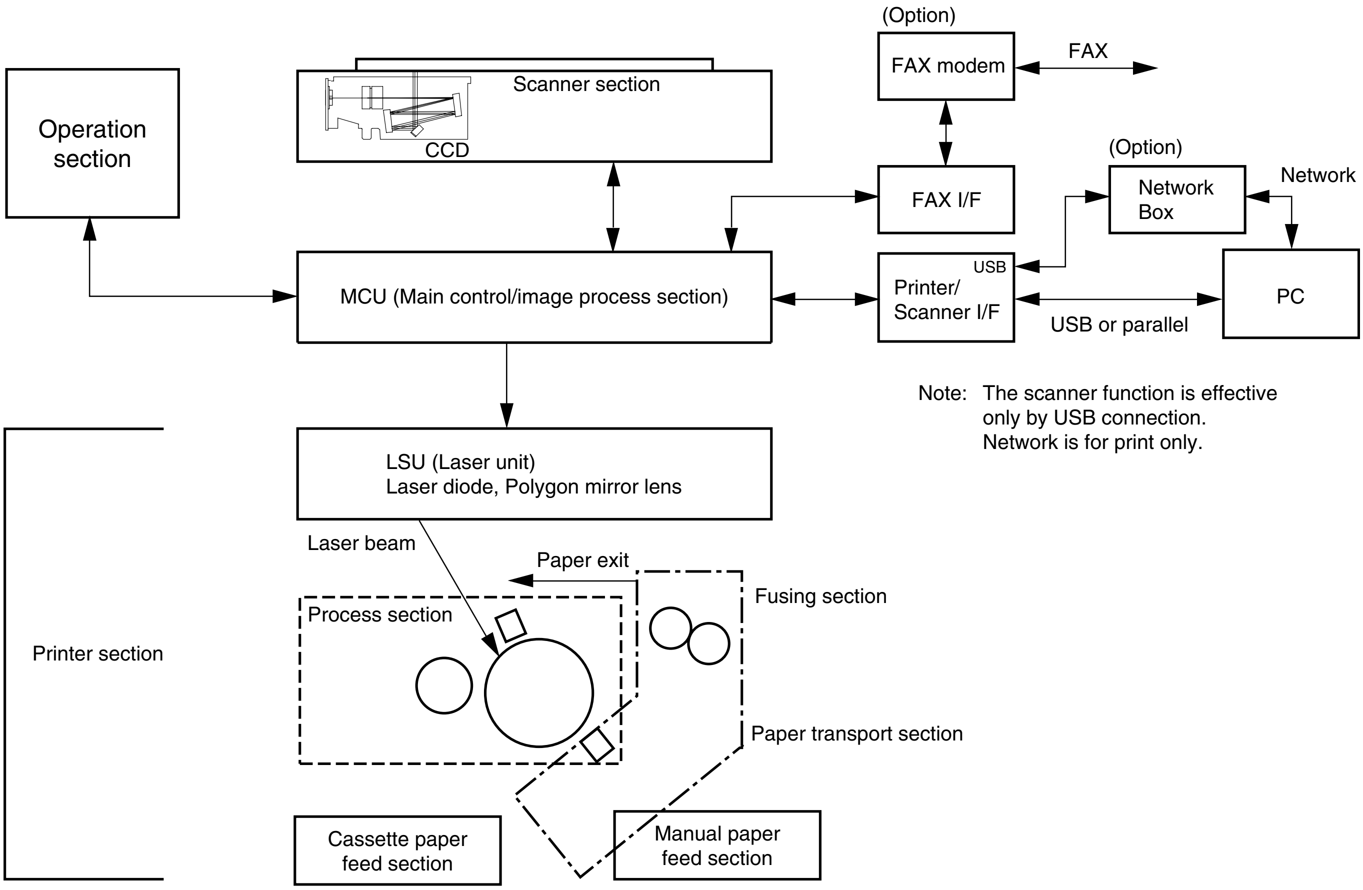
Normally, the developing bias voltage is retained for a certain time before the drum comes to a complete stop if the machine should stop before completing the normal print cycle. The developing bias can be added before resuming the operation after an abnormal interruption. Therefore, carrier will not make a deposit on the drum surface.

[7] OPERATIONAL DESCRIPTIONS

1. Outline of operation

The outline of operation is described referring to the basic configuration.

(Basic configuration)



(Outline of copy operation)

Setting conditions

1) Set copy conditions such as the copy quantity and the copy density with the operation section, and press the COPY button. The information on copy conditions is sent to the MCU.

Image scanning

2) When the COPY button is pressed, the scanner section starts scanning of images.
   The light from the copy lamp is reflected by the document and passed through the lens to the CCD.

Photo signal/Electric signal conversion

3) The image is converted into electrical signals by the CCD circuit and passed to the MCU.

Image process

4) The document image signal sent from the CCD circuit is processed under the revised conditions and sent to the LSU (laser unit) as print data.

Electric signal/Photo signal (laser beam) conversion

5) The LSU emits laser beams according to the print data.
   (Electrical signals are converted into photo signals.)
6) The laser beams are radiated through the polygon mirror and various lenses to the OPC drum.

Printing

7) Electrostatic latent images are formed on the OPC drum according to the laser beams, and the latent images are developed to be visible images(toner images).
8) Meanwhile the paper is fed to the image transfer section in synchronization with the image lead edge.
9) After the transfer of toner images onto the paper, the toner images are fused to the paper by the fusing section. The copied paper is discharged onto the exit tray.

(Outline of printer operation)

The print data sent from the PC are passed through the I/F and the MCU to the LSU. The procedures after that are the same as above 5) and later.

(Outline of scanner operation)

The scan data are passed through the MCU and the I/F to the PC according to the conditions requested by the PC or set by the operations with the operation panel.

2. Scanner section

A. Scanner unit

The scanner unit in the digital copier scans images.

It is composed of the optical unit and the drive unit. The optical unit performs scanning in the main scan direction with the light receiving elements (color CCD). The drive unit performs scanning in the sub scanning direction by moving the optical unit.

B. Optical system

Two white lamps are used as the light source.

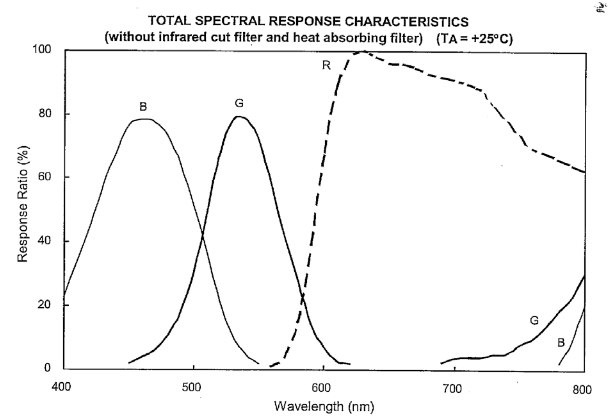
Light radiated from the light source is applied to the document on the document table. The reflected light from the document is reflected 5 times by No. 1 - No. 3 mirrors and passed through the reduction lens to form images on the light-receiving surface of 3-line CCD.

The light-receiving surface of the color CCD is provided with 3 line scanning sections for RGB. Separate images scanned in each color section are overlapped to complete color scanning. (When PC scanning)

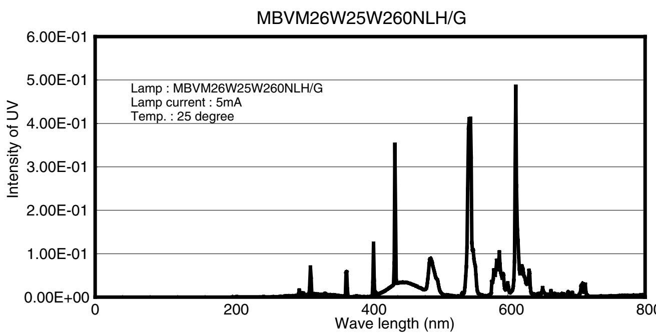
The resolution is 600dpi.

When copying, only the green component is used to print with the printer.

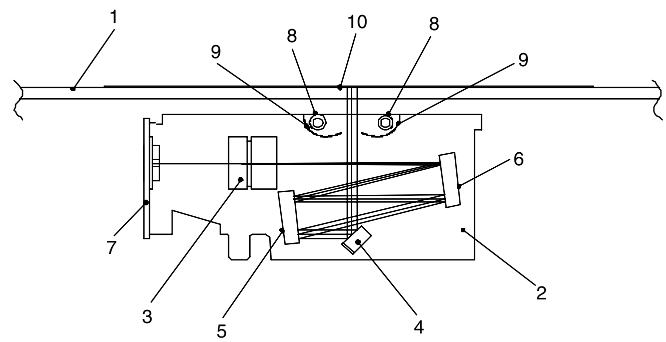
The color component for printing can be switched to red or blue by the service test command.



(Spectrum characteristics of the color CCD)



(Spectrum characteristics of the lamp)



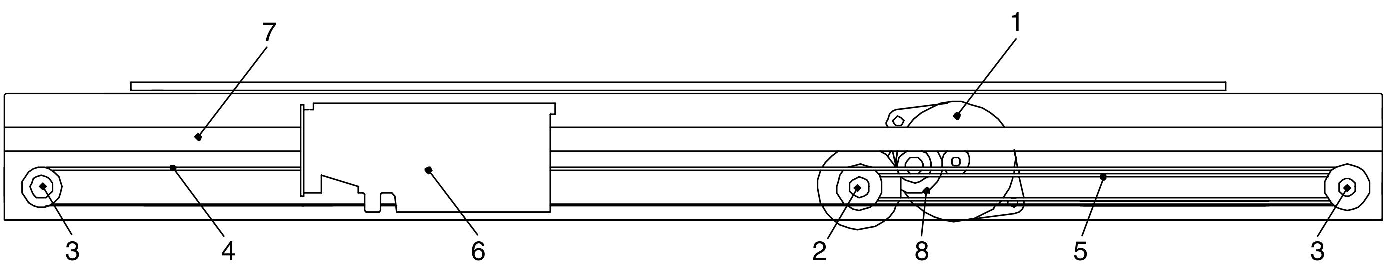
(Optical unit)

1	Table glass	2	Optical unit	3	Lens
4	Mirror 1	5	Mirror 2	6	Mirror 3
7	CCD PWB	8	Lamp	9	Reflector

C. Drive system

The drive system is composed of the scanner motor, the pulley gear, the idle pulley, the idle gear, the belt 473, the belt 190, and the shaft.

The motor rotation is converted into reciprocated movements of the belt 473 through the idle gear, the pulley gear, the belt 190, and the idle pulley to drive the optical unit.



1	Scanner motor	2	Pulley gear	3	Idle pulley
4	Belt 473	5	Belt 190	6	Optical unit
7	Shaft	8	Idle gear	9	

3. Laser unit

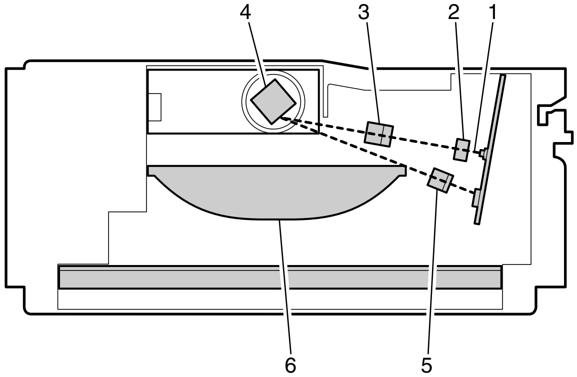
The image data sent from the MCU (image process circuit) is sent to the LSU (laser unit), where it is converted into laser beams.

A. Basic structure

The LSU unit is the writing section of the digital optical system.

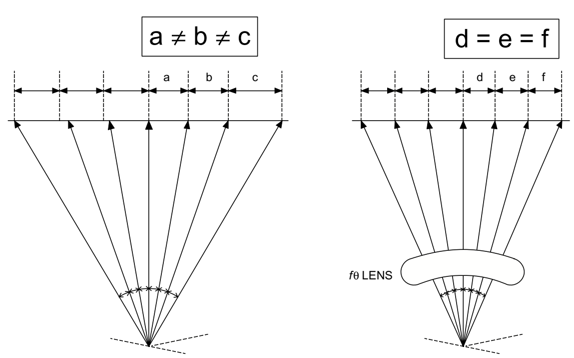
The semiconductor laser is used as the light source, and images are formed on the OPC drum by the polygon mirror and fθ lens, etc.

The laser beams are passed through the collimator lens, the cylindrical lens, the polygon mirror, the fθ lens, and the mirror to form images on the OPC drum in the main scanning direction. The laser emitting PWB is provided with the APC (auto power control) in order to eliminate fluctuations in the laser power. The BD PWB works for measurement of the laser writing start point.

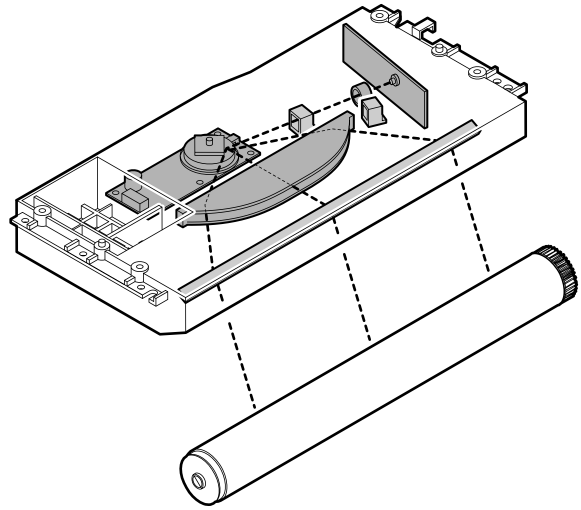


No	Component	Function
1	Semiconductor laser	Generates laser beams.
2	Collimator lens	Converges laser beams in parallel.
3	CY lens	Converges laser beams onto the polygon mirror surface.
4	Polygon mirror, polygon motor	Reflects laser beams at a constant rpm. (A four-surfaces polygon mirror is used.)
5	BD (Mirror, lens, PWB)	Detects start timing of laser scanning.
6	fθ lens	Converges laser beams at a spot on the drum.
		Makes the laser scanning speeds at both ends of the drum same as each other. (Refer to the figure below.)

Makes the laser scanning speeds at both ends of the drum same as each other.



B. Laser beam path



C. Composition

Effective scanning width: 216mm (max.)

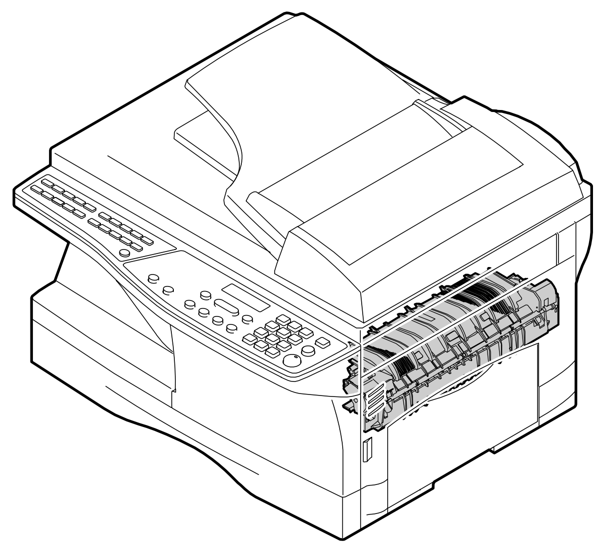
Resolution: 600dpi

Beam diameter: 75um in the main scanning direction, 80um in the sub scanning direction

Image surface power: 0.15 ±0.01mW (Laser wavelength 770 - 795nm)

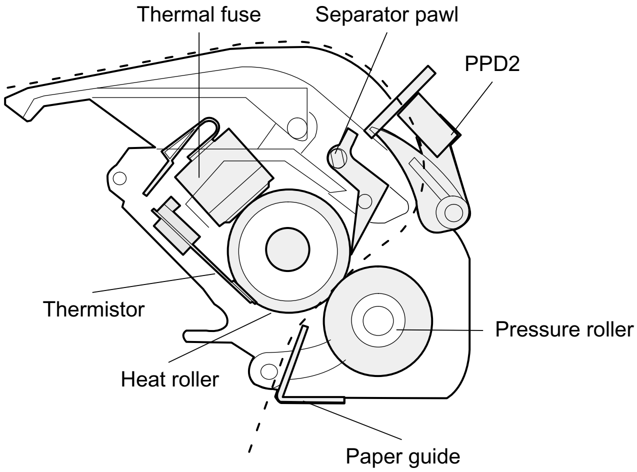
Polygon motor section: Brushless motor 31,180rpm
No. of mirror surfaces: 4 surfaces

4. Fuser section

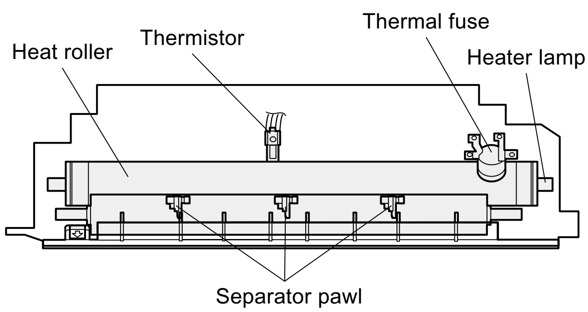


A. General description

General block diagram (cross section)



Top view



(1) Heat roller

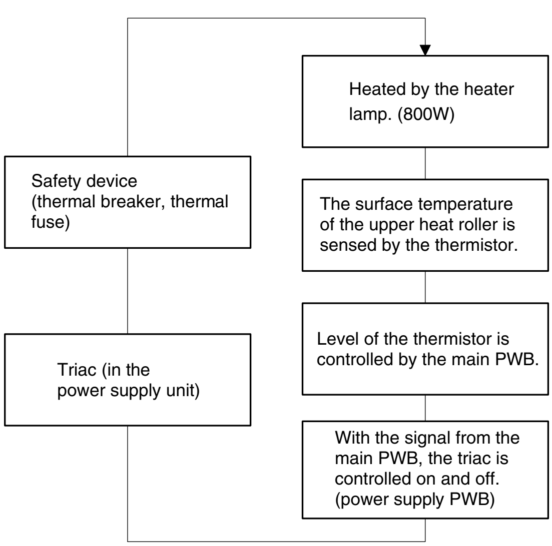
A Teflon roller is used for the heat roller and a silicone rubber roller is used for the lower heat roller for better toner fusing performance and paper separation.

(2) Separator pawl

Three separator pawls are used on the upper heat roller. The separator pawls are Teflon coated to reduce friction with the roller and prevent a smear on the paper caused by the separator pawl.

(3) Thermal control

1) The heater lamp, thermistor, main PWB, DC power supply PWB, and triac within the power supply unit are used to control the temperature in the fuser unit.
   To prevent against abnormally high temperature in the fuser unit, a thermal breaker and thermal fuse are used for safety purposes.



2) The surface temperature of the upper heat roller is set to 165 - 190°C. The surface temperature during the power save mode is set to 100°C.
3) The self-check function comes active when one of the following malfunctions occurs, and an "H" is displayed on the multicopy window.

a. When the heat roller surface temperature rises above 240°C.
b. When the heat roller surface temperature drops below 100°C during the copy cycle.
c. Open thermistor
d. Open thermal fuse
e. When the heat roller temperature does not reach 190°C within 27 second after supplying the power.

(4) Fusing resistor

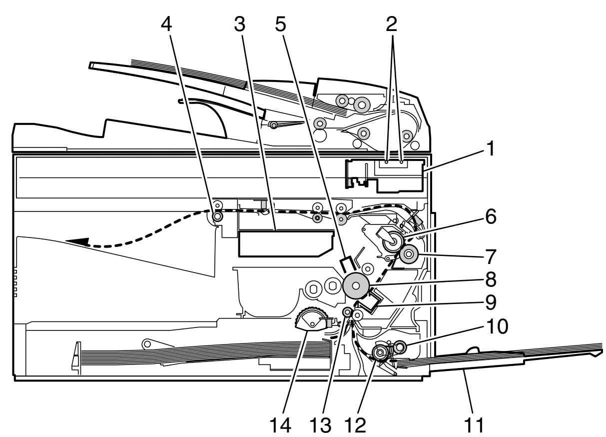
Fusing resistor

This model is provided with a fusing resistor in the fusing section to improve transfer efficiency.

Since the upper heat roller is conductive, when using copy paper that contains moisture and the distance between the transfer unit and the fusing unit is short, the transfer current may find a path to ground via the copy paper, the upper heat roller and the discharging brush.

5. Paper feed section and paper transport section

A. Paper transport path and general operations



1	Scanner unit	8	Drum
2	Copy lamp	9	Transfer unit
3	LSU (Laser unit)	10	Pickup roller
4	Paper exit roller	11	Manual paper feed tray
5	Main charger	12	Manual paper feed roller
6	Heat roller	13	PS roller unit
7	Pressure roller	14	Paper feed roller

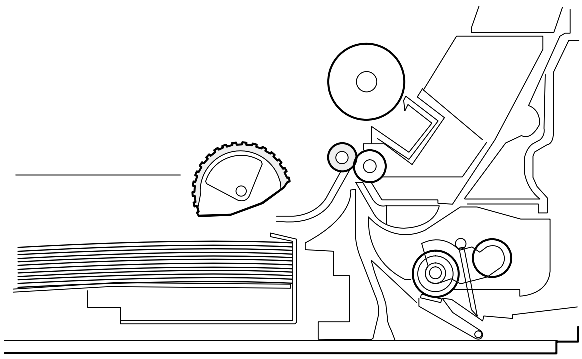
Paper feed is made in two ways; the tray paper feed and the manual paper feed. The tray is of universal-type, and has the capacity of 250 sheets.

The front loading system allows you to install or remove the tray from the front cabinet.

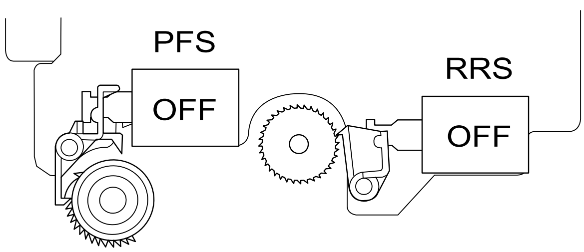
The general descriptions on the tray paper feed and the manual paper feed operation are given below.

(1) Cassette paper feed operation

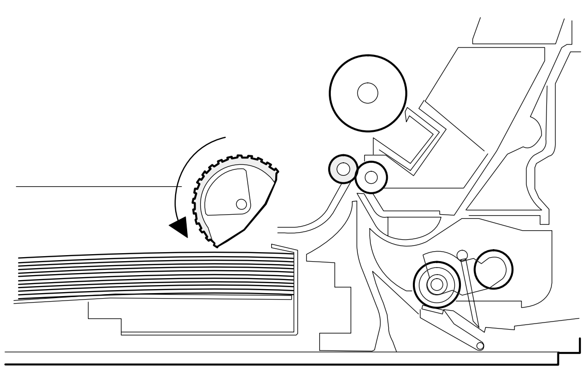
1) The figure below shows the positions of the pick-up roller, the paper feed clutch sleeve, and the paper feed latch in the initial state without pressing the COPY button after lighting the ready lamp.
The paper feed latch is in contact with the projection of the clutch sleeve.

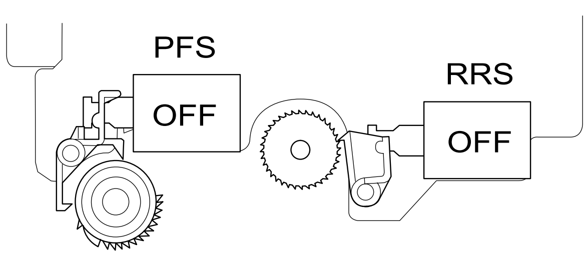


2) When the COPY button is pressed, the main drive motor starts rotating to drive each drive gear.
The pick-up drive gear also is driven at that time. Since, however, the paper feed latch is in contact with the projection of the clutch sleeve, rotation of the drive gear is not transmitted to the pick-up roller, which does not rotate therefore.



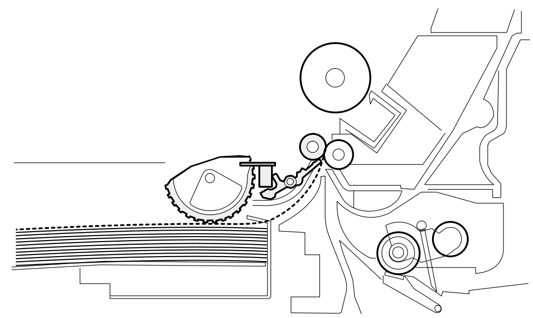
3) After about 0.1 sec from when the main motor start rotating, the tray paper feed solenoid (PFS) turns on for a moment.
This disengages the paper feed latch from the projection of the clutch sleeve, transmitting rotation of the pick-up drive gear to the paper feed roller shaft, rotating the pick-up roller to feed the paper.

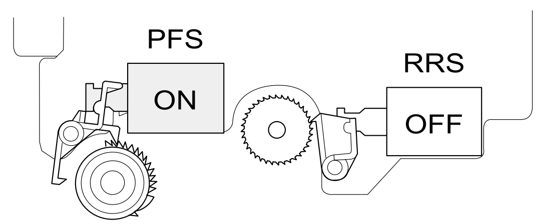




4) After more than half rotation of the pick-up roller, the paper feed latch is brought in contact with a notch on the clutch sleeve, stopping rotation of the pick-up roller.

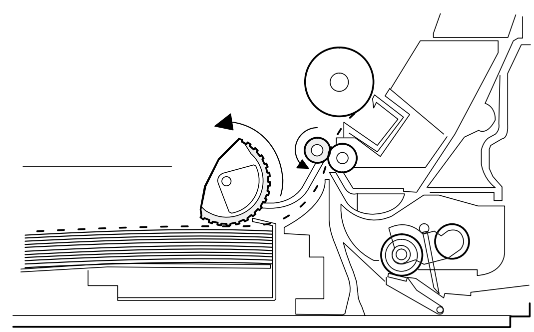
5) At this time, the paper is fed passed the paper entry detection switch (PPD1), and detected by it. After about 0.15 sec from detection of paper by PPD1, the tray paper feed solenoid (PFS) turns on so that the clutch sleeve projection comes into contact with the paper feed latch to stop the pick-up roller. Then the pick-up roller rotates for about 0.15 sec so that the lead edge of the paper is evenly pressed on the resist roller, preventing against skew feeding.

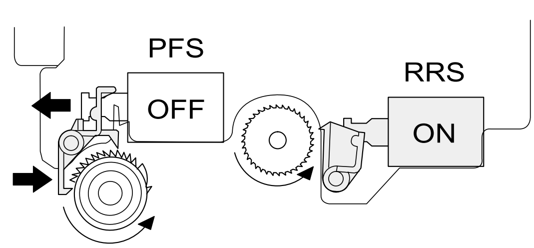




6) To release the resist roller, the tray paper feed solenoid and the resist solenoid are turned on by the paper start signal to disengage the resist start latch from the clutch sleeve, transmitting rotation of the resist drive gear to the resist roller shaft. Thus the paper is transported by the resist roller.

7) After the resist roller starts rotating, the paper is passed through the pre-transfer guide to the transfer section. Images are transferred on the paper, which is separated from the OPC drum by the drum curve and the separation section.

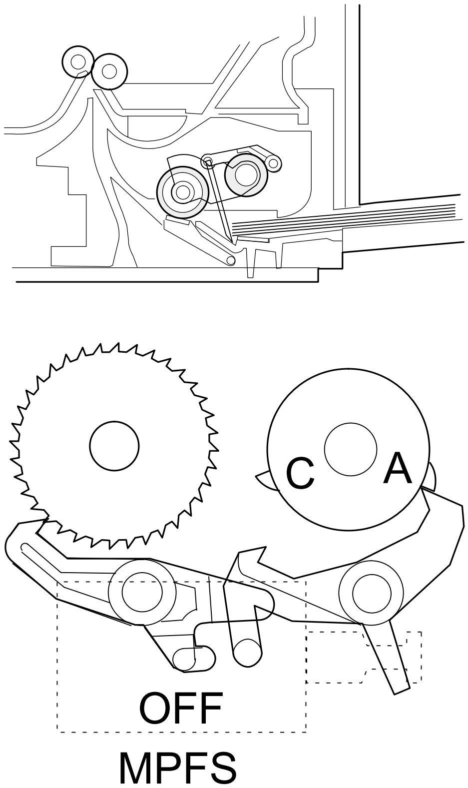




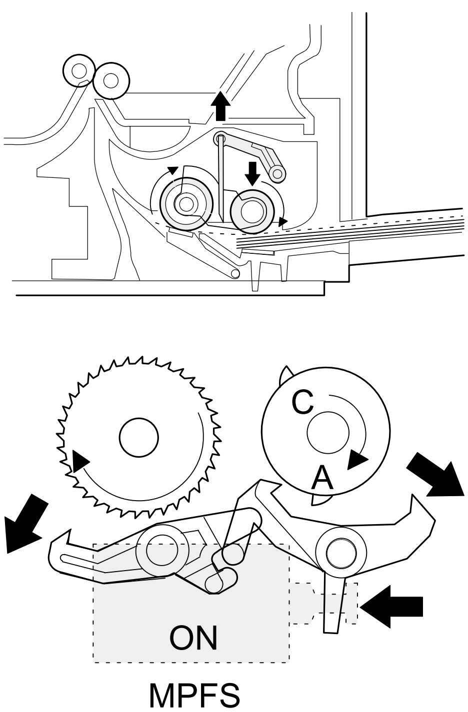
8) The paper separated from the drum is passed through the fusing paper guide, the heat roller (fusing section), POD (paper out detector) to the copy tray.

(2) Manual multi paper feed operation

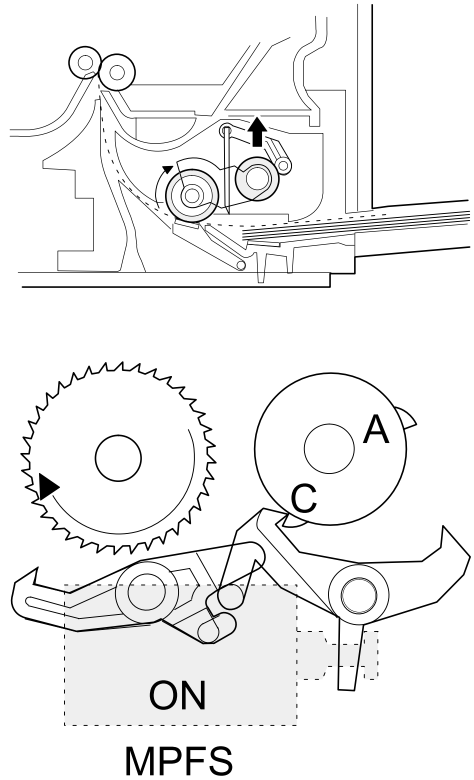
1) Before paper feed operation, the manual paper feed solenoid (MPFS) is turned OFF as shown in the figure below.



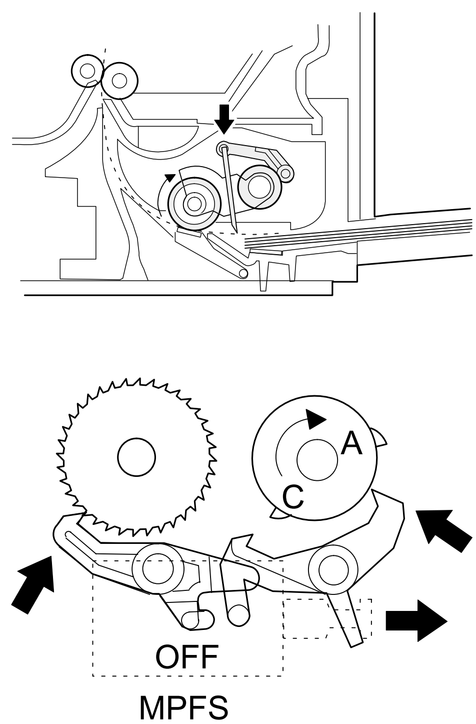
2) When the PRINT button is pressed, the manual paper feed solenoid (MPFS) turns on to disengage the manual paper feed latch.
   A from the manual paper feed clutch sleeve A, rotating the manual paper feed roller and the manual take-up roller. At the same time, the manual paper feed stopper opens and the manual take-up roller is pressed to the surface of the paper to start paper feeding.



3) When pawl C of the manual paper feed clutch sleeve is engaged with the manual feed latch, the manual feed stopper falls and the manual take-up roller rises. At that time, the manual paper feed roller is rotating.



4) The lead edge of the transported paper is pressed on the resist roller by the transport roller. Then the paper is stopped temporarily to allow synchronization with the lead edge of the image on the OPC drum.
   From this point, the operation is the same as the paper feed operation from the tray. (Refer to A-5 - 8.)
5) The solenoid turns off to close the gate and return to the initial state.



(3) Conditions of occurrence of paper misfeed

a. When the power is turned on:

PPD or POD is ON when the power is turned on.

b. Copy operation

a	PPD1 jam	PPD1 does not turn off within 4 sec after turning on the resist roller.
b	PPD2 jam	PPD2 is off immediately after turning on the resist roller.
		PPD2 does not turn off within 1.2 sec after turning off the resist roller.
c	POD jam	POD does not turn on within 2.9 sec after turning on the resist roller.
		POD does not turn off within 1.5 sec - 2.7 sec after turning off PPD2.

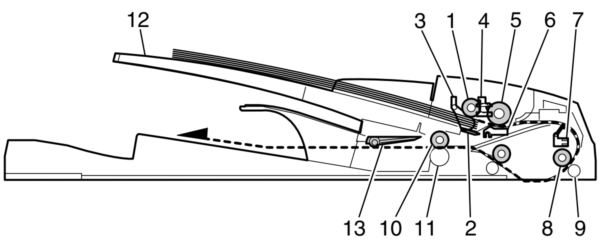
6. RSPF section

A. Outline

The RSPF (Reverse Single Path Feeder) is installed to the AR-168L as a standard provision, and it automatically copies up to 30 sheets of documents of a same size. (Only one set of copies)

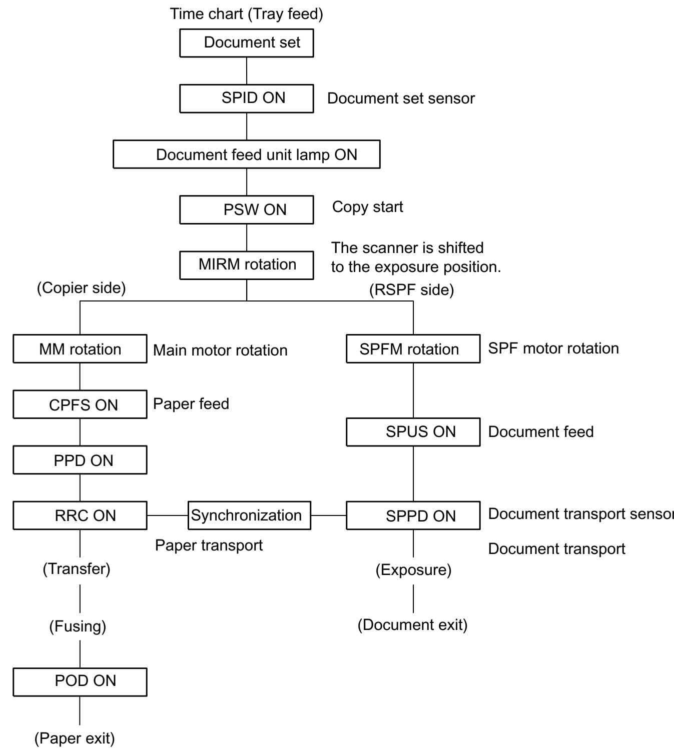
B. Document transport path and basic composition

(RSPF)

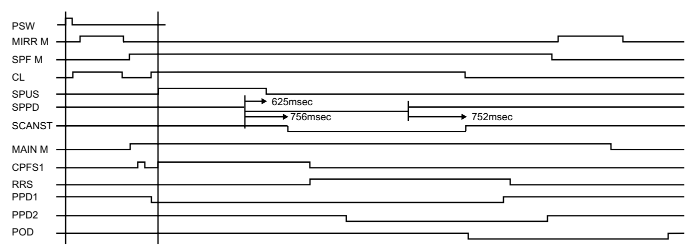


1	Pickup roller	2	Sheet of document for paper feed
3	Set detection ACT	4	Paper stopper
5	Document feed roller	6	Separation sheet
7	Paper entry sensor	8	PS roller D
9	Transport follower roller	10	Paper exit roller
11	Paper exit follower roller	12	Document tray
13	Switch gate (RSPF)		

C. Operational descriptions



In the zooming mode, the magnification ratio in the sub scanning direction (paper transport direction) is adjusted by changing the document transport speed.

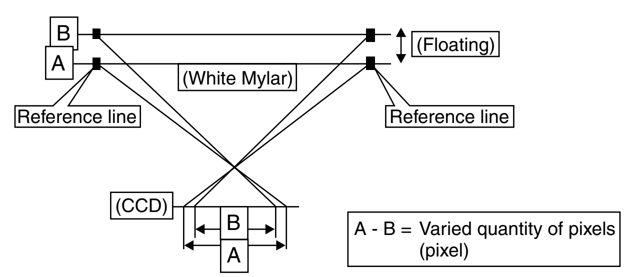


D. Cases where a document jam is caused

1) When SPPD is ON (document remaining) when the power is turned on.
2) When SPPD is not turned ON within about 1.5 sec (at 100% copy) after starting the document feed operation.
3) When SPPD is not turned on within about 4.7 sec (at 100% copy) after turning on SPPD.
4) When the RSPF document jam release door or the OC cover is opened during document transport (RSPF motor rotating).

E. RSPF open/close detection (book document detection)

RSPF open/close detection (book document) detection is performed by detecting the interval between the reference lines on the white Mylar attached to the paper exit guide (document scanning section) by the scanner (CCD) and detecting the varied quantity.



7. D-D (Duplex to Duplex) mode paper/ document transport (Duplex model)

A. Initial state

Set duplex documents on the document tray.

Set paper on the cassette. (In the duplex mode, the manual feed tray cannot be selected.)

B. Front copy

Document transport:

The document feed roller feeds the document from the paper feed roller to the PS roller.

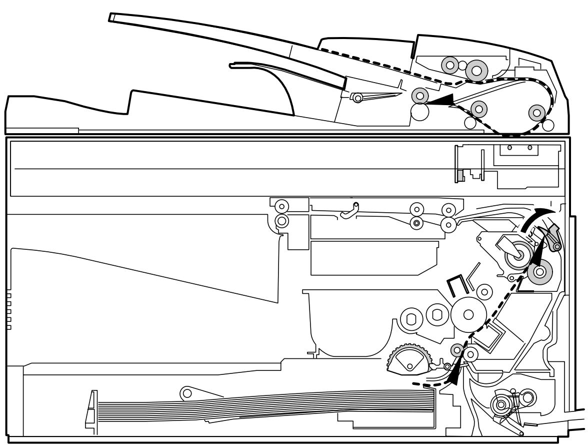
- The document is exposed in the exposure section, and sent to the document exit section
- by the transport/paper exit roller.
- R-SPF gate solenoid ON
- The document is sent to the intermediate tray. (but not discharged completely.)
- The document is stopped once, then switchback operation is performed. (To the back copy)

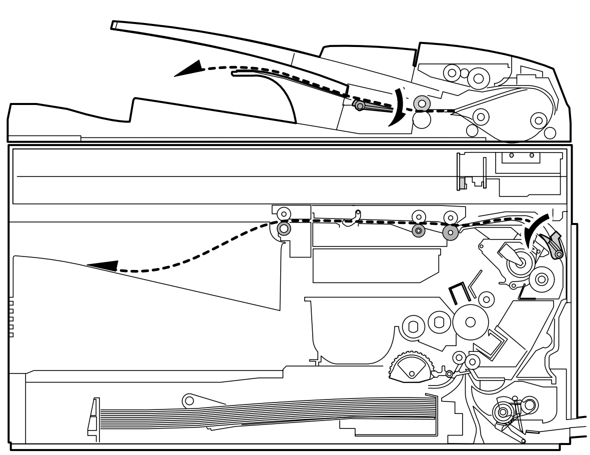
Paper transport:

The document is passed through the paper feed roller and the PS roller by the paper feed roller

and the images on the front surface are transferred.

- The paper is passed through the fusing section and the lower side of the gate section to the paper exit tray side, (but not discharged completely.)
- It is stopped once and switchback operation is performed. (To the back copy)





C. Back copy

Document transport:

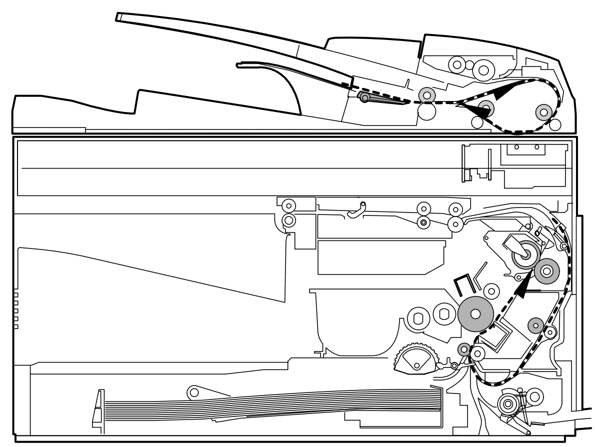
By switchback operation, the document is sent through the PS roller to the exposure section, where the back of the document is exposed.

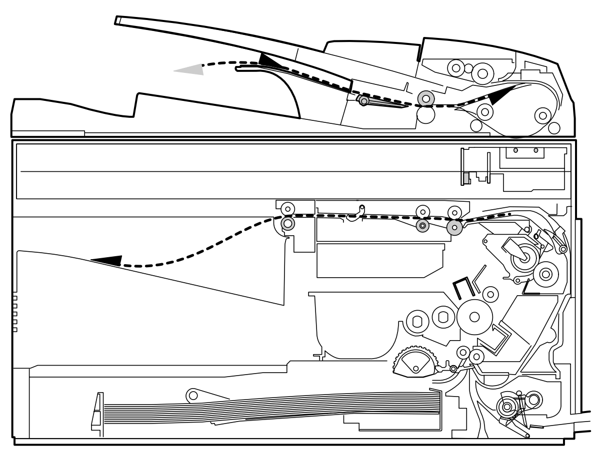
- It is sent to the document exit section by the transport roller and the paper exit roller.
- R-SPF gate solenoid ON. The document is sent to the intermediate tray, (but not discharged completely.)
- It is stopped once and switchback operation is performed.
- It is sent through the PS roller and the exposure section (without exposure operation) to the document exit section.
- R-SPF gate solenoid OFF
- The document is discharged to the document exit tray.

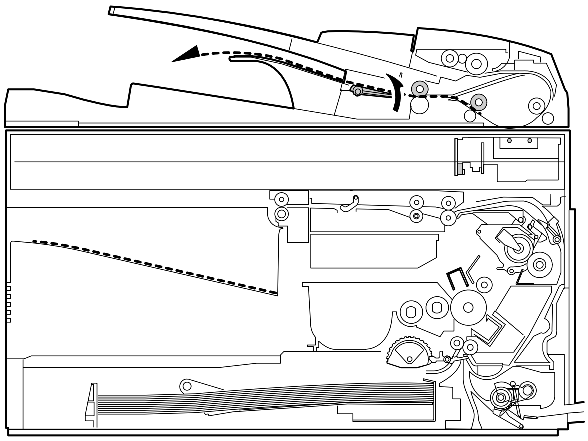
Paper transport:

Switchback operation is performed.

- The paper is sent through the upper side of the gate section and the duplex transport section, and the PS roller, and the images on the back are transferred.
- It is sent through the fusing section and discharged to the paper exit tray.







Switchback operation is made after back copying in order to discharge documents according to the setting.

Set document Documents after discharge,

$\frac{1}{2}$	with empty feed	$\frac{4}{3}$	without empty feed	$\frac{3}{4}$
$\frac{3}{4}$		$\frac{2}{1}$		$\frac{1}{2}$

There are following job modes as well as D-D mode.

S - S (Simplex to Simplex)

S - D (Simplex to Duplex),

Rotation copy mode (The back images are rotated 180°C.)

S - D (Simplex to Duplex), Copy mode without rotation

D - S (Duplex to Simplex)

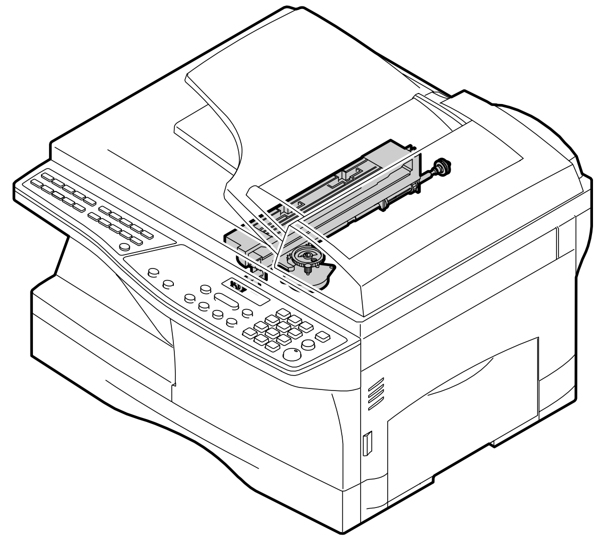
Rotation copy mode:

The front and the back are in upside down each other.

Copy mode without rotation:

The front and the back are not in upside down.

8. Shifter



Shift width: 2.5cm

The offset function by the shifter is turned ON/OFF by the user program.

According to the setting, offset operation is performed for every job. (Default: ON)

[8] DISASSEMBLY AND ASSEMBLY

Before disassembly, be sure to disconnect the power cord for safety.

1. **Do not disconnect or connect the connector and the harness during the machine is powered. Especially be careful not to disconnect or connect the harness between the MCU PWB and the LSU (MCU PWB: CN20) during the machine is powered. (If it is disconnected or connected during the machine is powered, the IC inside the LSU will be destroyed.)**
2. **To disconnect the harness after turning on the power, be sure to turn off the power and wait for at least 10 sec before disconnection. (Note that a voltage still remains immediately after turning off the power.)**

The disassembly and assembly procedures are described for the following sections:

1. High voltage section
2. Operation panel section
3. Optical section
4. Fusing section
5. Tray paper feed/transport section
6. Manual paper feed section
7. Rear frame section
8. Power section
9. Duplex motor section
10. Reverse roller section
11. RSPF section

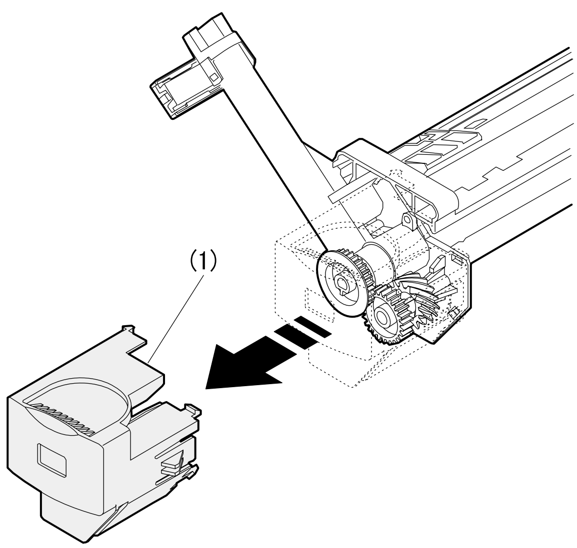
1. High voltage section

A. List

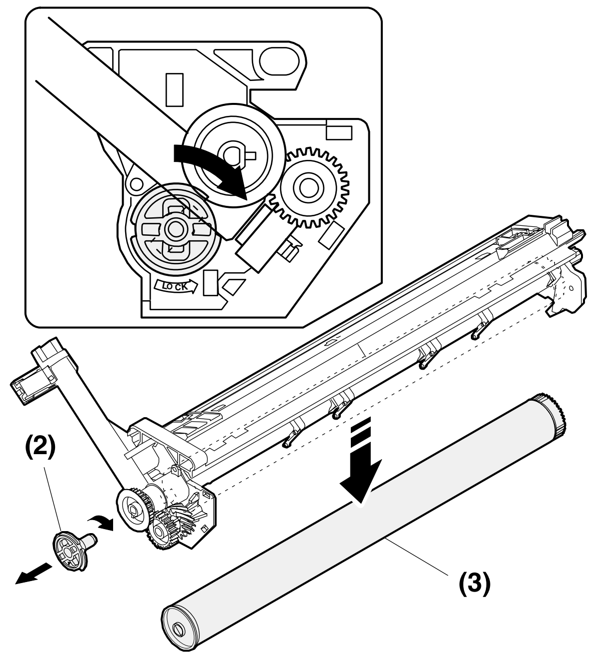
No.	Part name Ref.
1	Drum
2	Transfer charger unit
3	Charger wire

B. Drum replacement

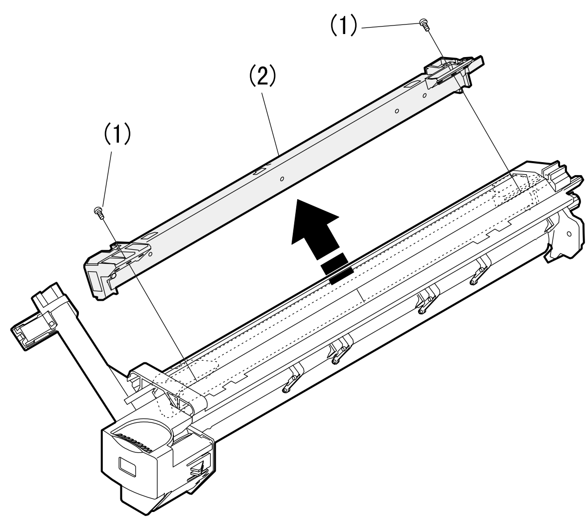
1) Remove the drum cover. (4 Lock Tabs)



2) Remove the drum fixing plate and the photoconductor drum.
   (Note) Dispose the drum fixing plate which was removed.

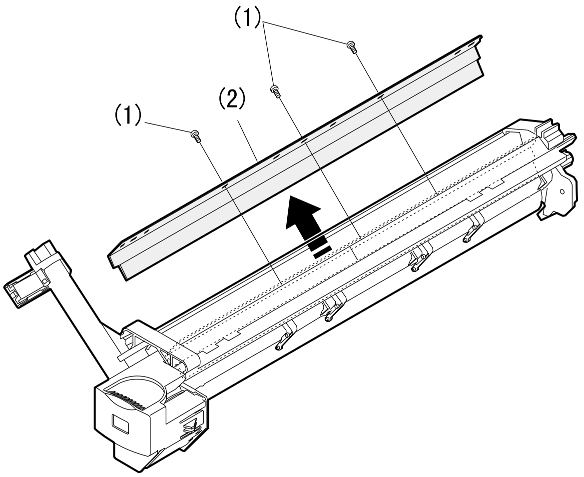


3) Check the cleaning blade and the red felt for no damage.
   - If there is any damage, execute all procedures from item 5) and later.
   - If there is no damage, execute the procedure of item 12).
4) Remove the main charger.
   (Cleaning the screen grid and the sawteeth.)



5) Remove the cleaning blade.

Note: Dispose the cleaning blade which was removed.



6) Clean the cleaning section and the waste toner pipe to remove waste toner completely with a vacuum cleaner.

7) Remove the felt and duplex tape completely.

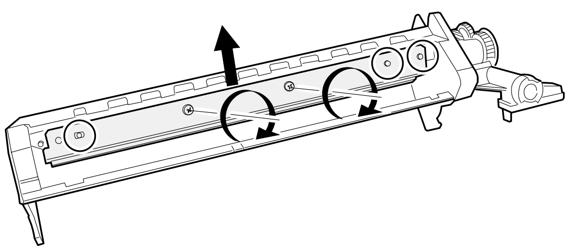
Note: Be careful not to scratch or bend the sub blade.

8) Attach the cleaning blade.

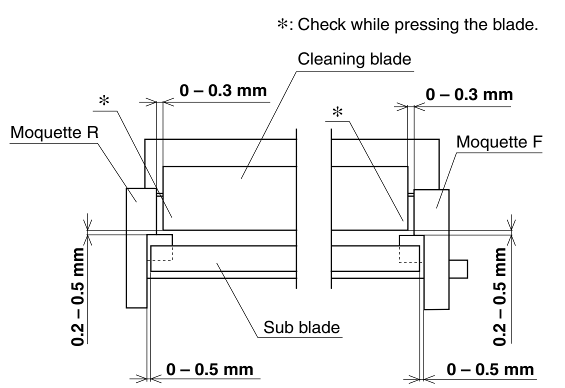
Securely insert the plate section of the cleaning blade into the unit and fix it with a screw.

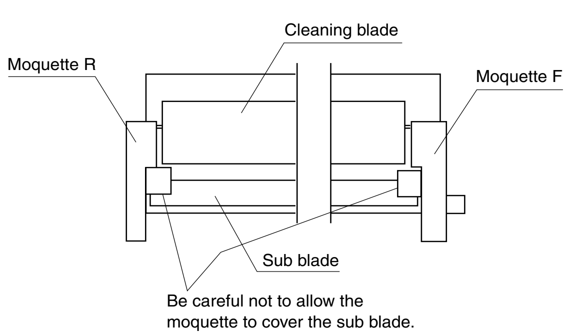
Do not touch the cleaning blade rubber with your hand.

When attaching the cleaning blade, press the cleaning blade in the arrow direction and attach.



9) Attach the felt.





Example of NG

Attach the mocket with slightly pressing section A of the cleaning blade.

Do not touch the tip of the cleaning blade.

Do not put the mocket under the cleaning blade.

Do not put the mocket on the sub blade.

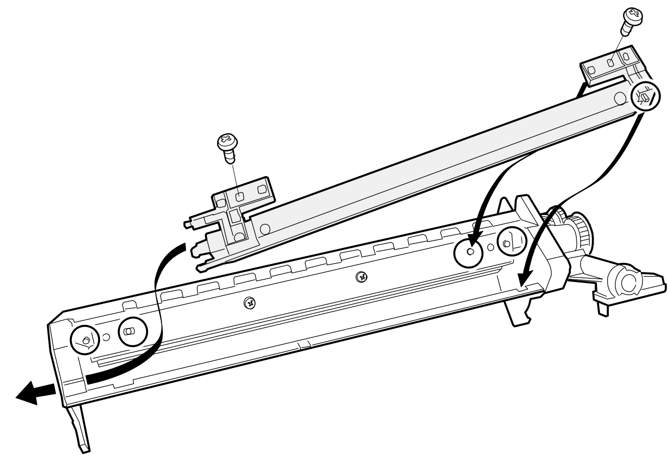
Do not press the sub blade with the mocket.

10) Attach the main charger.

Securely set the MC holder on the projection of the process frame.

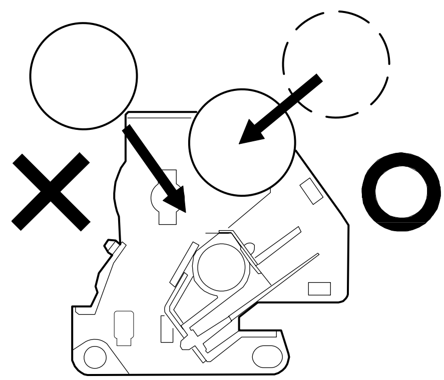
Securely insert two projections of the MC holder into the groove in the process frame.

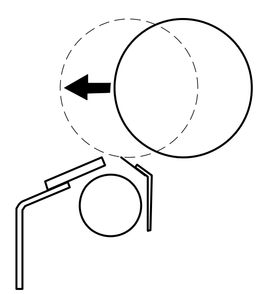
When attaching the MC holder ass'y, be careful not to make contact with the cleaning blade.



11) Attach the drum fixing plate and the photoconductor drum.

Apply grease to the inside of the photoconductor drum. (Dia. 2)





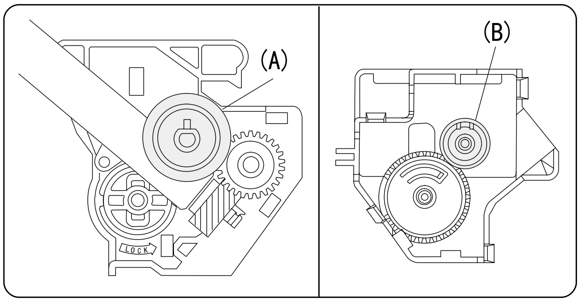
Attach the drum from (b). (Prevention against the sub blade edge breakage)

Attach the drum so that its position with the sub blade is as shown.

12) Attach the detection gear.

Note:

- The detection gear is not installed to the drum cartridge packed with the main body. Add a new one.

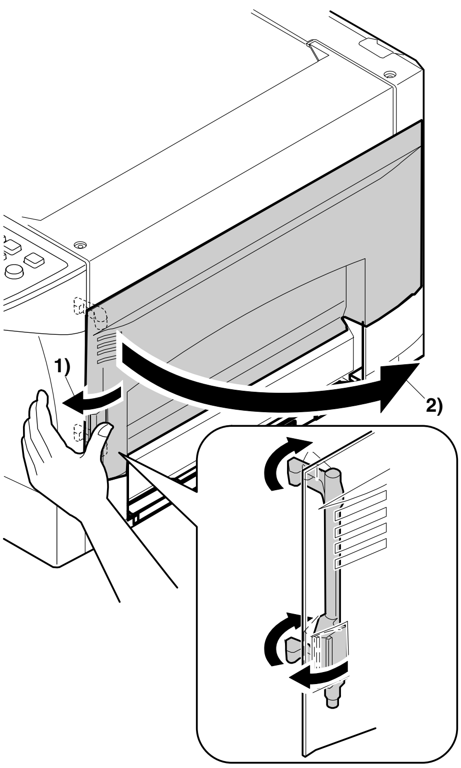


13) Attach the drum cover.

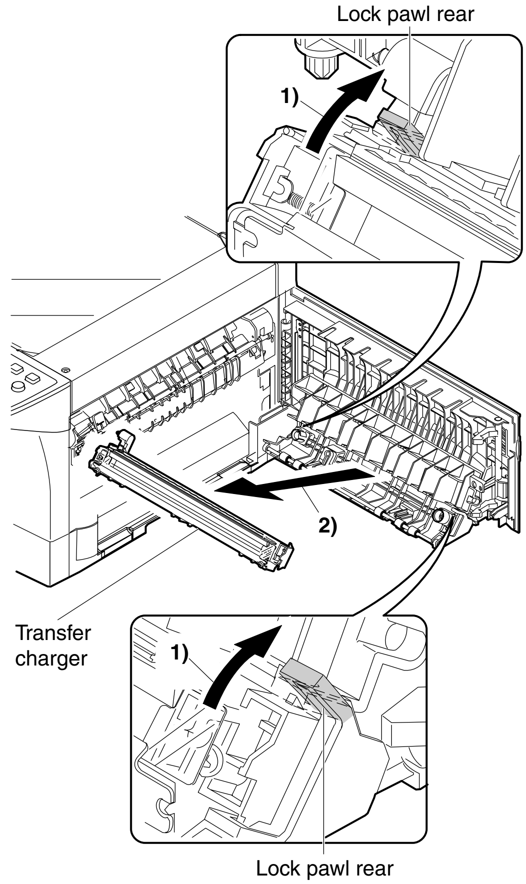
Note: After attaching the drum cover, do not make a copy.
When attaching the drum cover, engage the detection gear 20T rib with the 30T gear rib, and attach the drum cover to the process frame.

C. Disassembly procedure (Transfer charger unit)

1) Press the side cover open/close button and open the side cover.



2) Push up the lock pawls (2 positions) of the side cover, and remove the transfer charger.

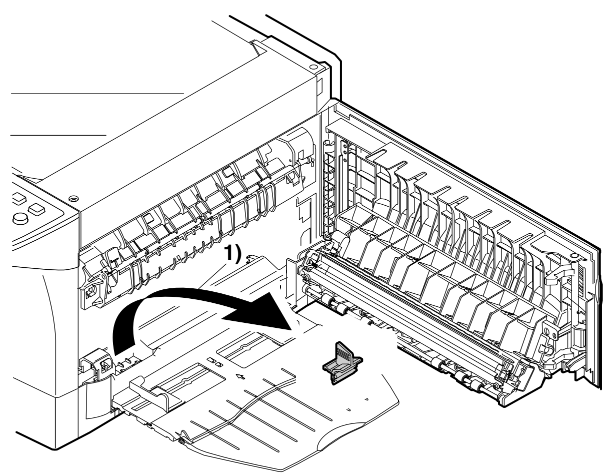


D. Assembly procedure

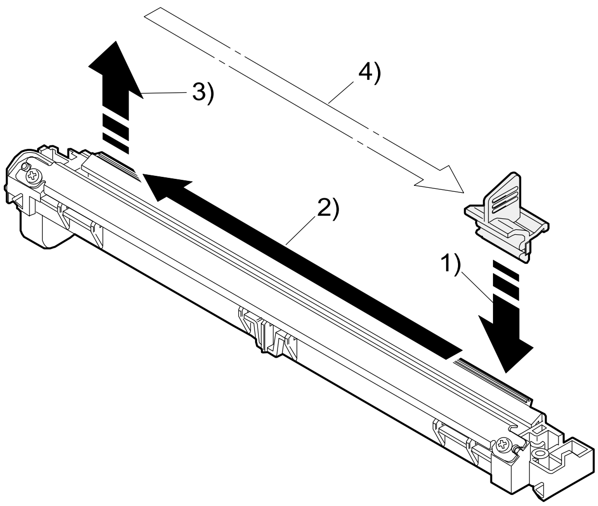
For assembly, reverse the disassembly procedure.

E. Charger wire cleaning

1) Remove the charger cleaner from the manual paper feed unit.



2) Set the charger cleaner to the transfer unit, and move it reciprocally a few times in the direction of the arrow shown in the figure below.



F. Charger wire replacement

1) Remove the TC cover and remove the screw.
2) Remove the spring and remove the charger wire.
3) Install a new charger wire by reversing the procedures (1) and (2). At that time, be careful of the following items.

- The rest of the charger wire must be within 1.5mm. Refer to Fig.1
- The spring hook section (charger wire winding section) must be in the range of the projection section.
- Be careful not to twist the charger wire.

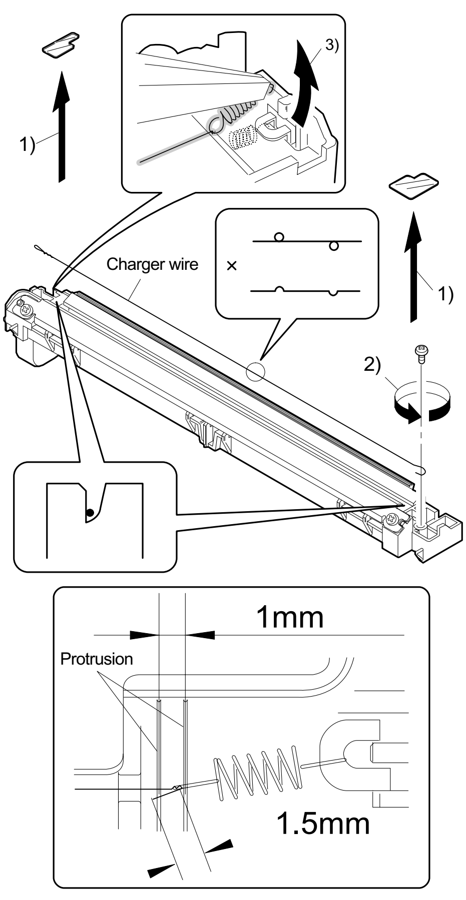


Fig.1

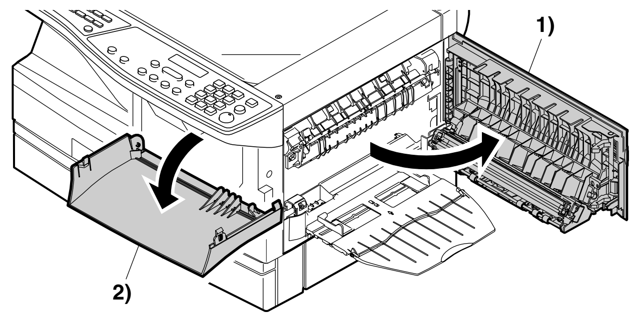
2. Operation panel section

A. List

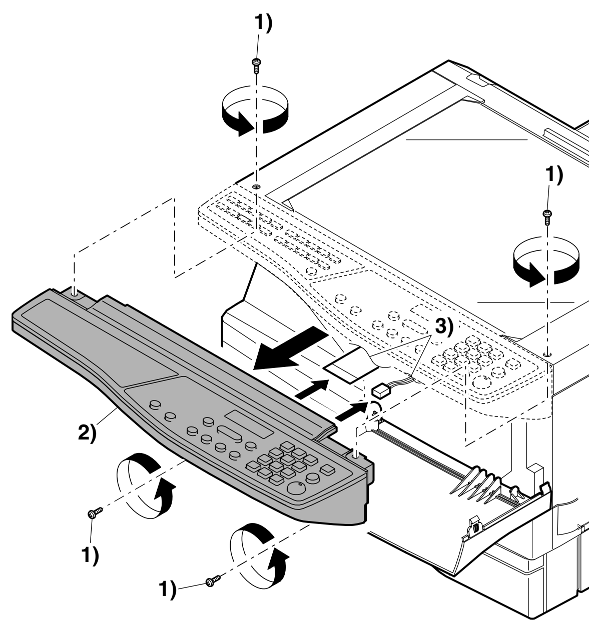
No.	Part name Ref.
1	Operation panel unit
2	Operation PWB

B. Disassembly procedure

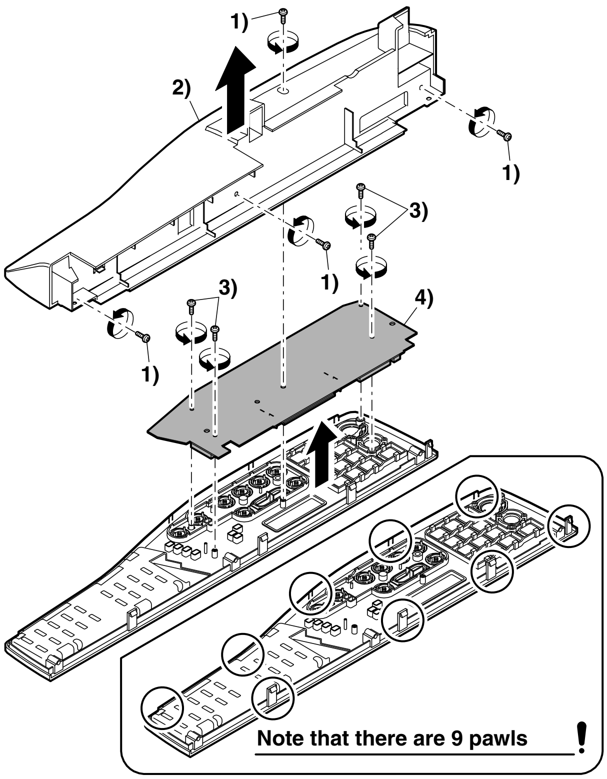
1) Open the side door, and Open the front cover.



2) Remove the screws (4 pcs.), the harness, and the operation panel unit.



3) Remove four screws, and remove the operation cabinet.
4) Remove four screws, and remove the operation PWB.



C. Assembly procedure

For assembly, reverse the disassembly procedure

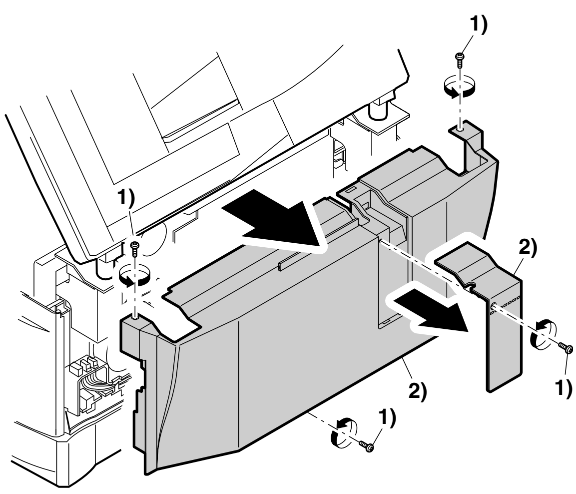
3. Optical section

A. List

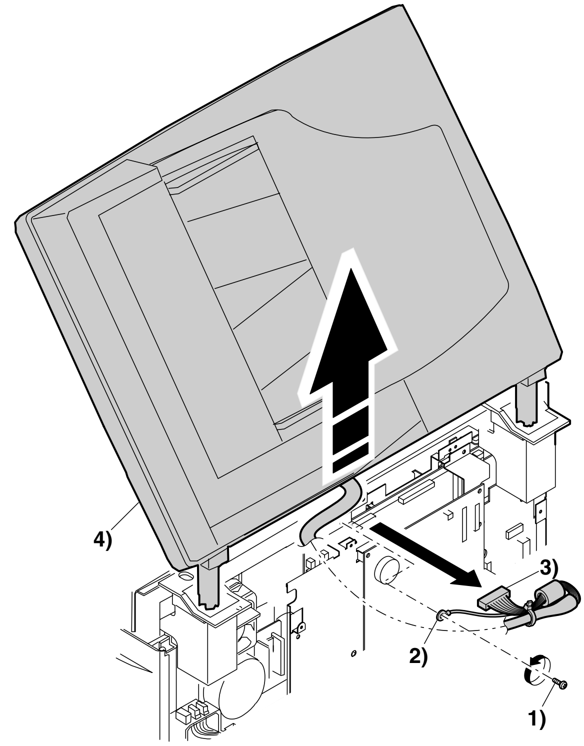
NO.	Part name Ref.
1	Copy lamp unit
2	Copy lamp
3	Lens unit

B. Disassembly procedure

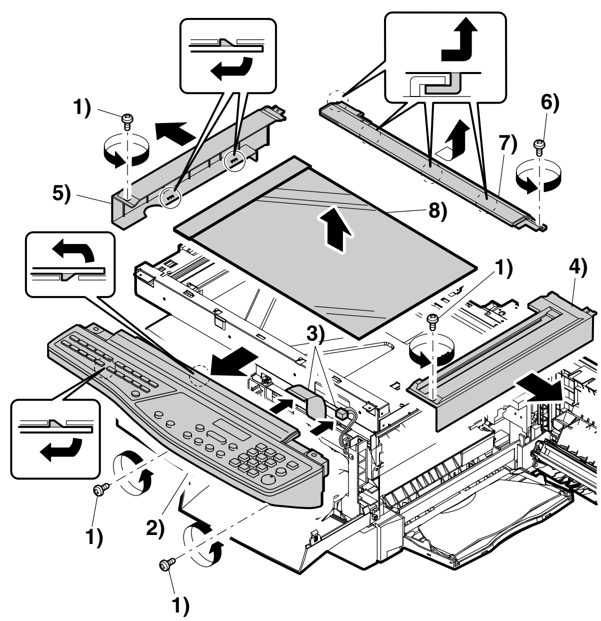
1) Remove four screws, and remove the rear cabinet and the rear cabinet cover.



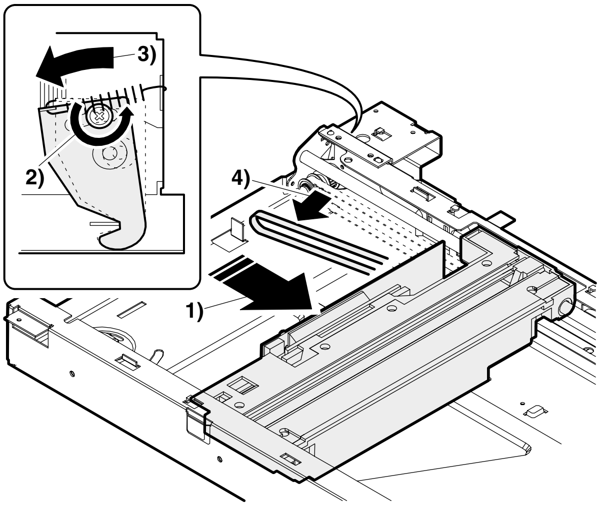
2) Remove the connector and the clamp, and remove the RSPF unit.



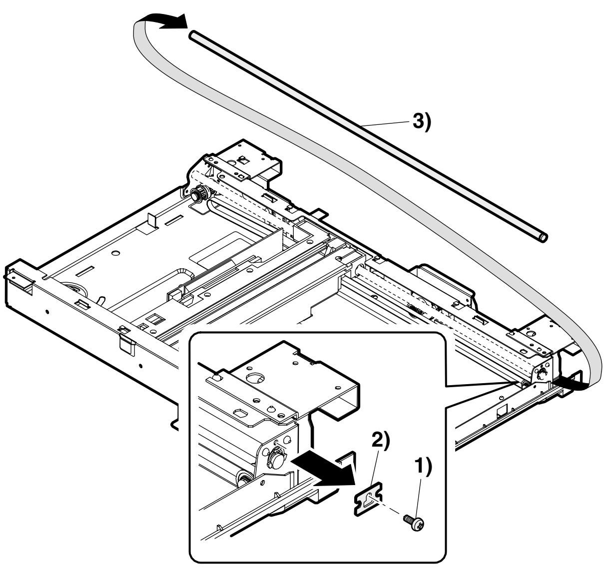
3) Remove the four screws, remove the operation unit, and disconnect the connector.
4) Remove the right cabinet.
5) Remove the left cabinet.
6) Remove the screw, and remove the rear cover.
7) Remove the table glass.



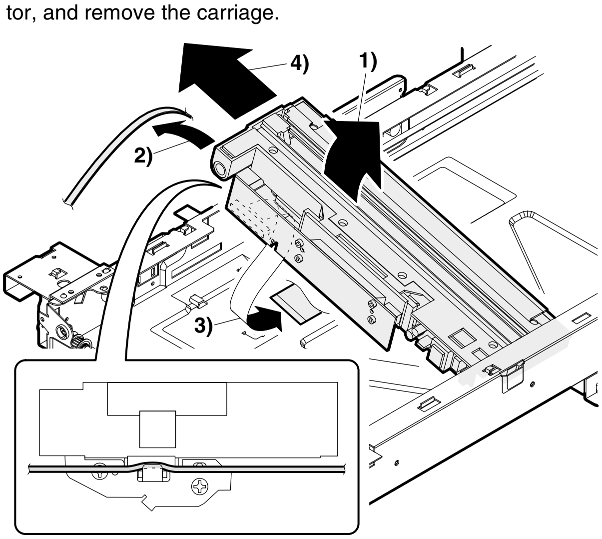
8) Move the carriage to the position indicated on the figure.
9) Loosen the screw which is fixing the tension plate.
10) Move the tension plate in the arrow direction to release the tension, and remove the belt.



11) Remove the screw, and remove the rod stopper.
12) Remove the rod.



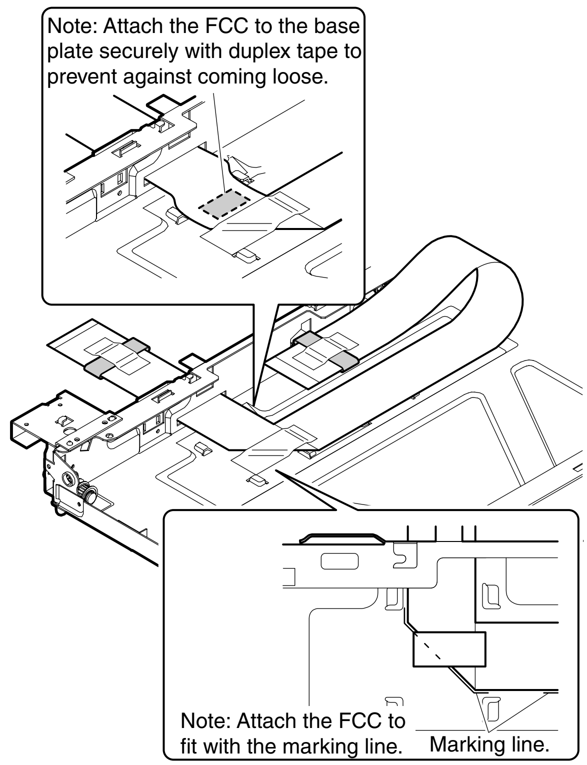
13) Lift the rear side of the carriage, remove the belt and the connector, and remove the carriage.

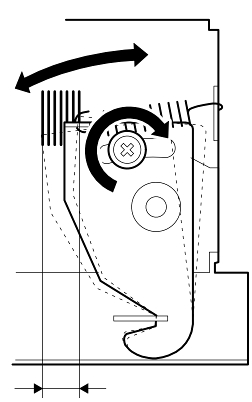


C. Assembly procedure

CCD core

1) Pass the core through the CCD-MCU harness.
2) Insert the CCD-MCU harness into the CCD PWB connector of the carriage unit.
3) Move the core which was passed through the CCD-MCU harness near the CCD PWB connector as shown in the figure below, and fix it with a filament tape (19mm wide, 40mm long). For the attachment reference, refer to the figure below. Clean and remove oil from the attachment section.
4) Attach the CCD-MCU harness to the duplex tape on the back of the carriage unit.
5) Attach the PWB holder to the position specified in the figure below.
6) Pass the core through the FFC and the PWB holder, and fix the core.





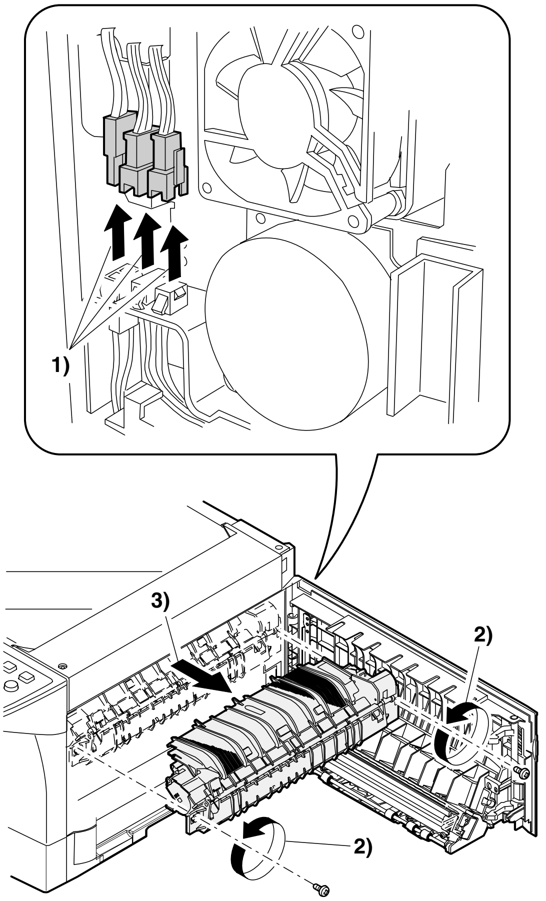
4. Fusing section

A. List

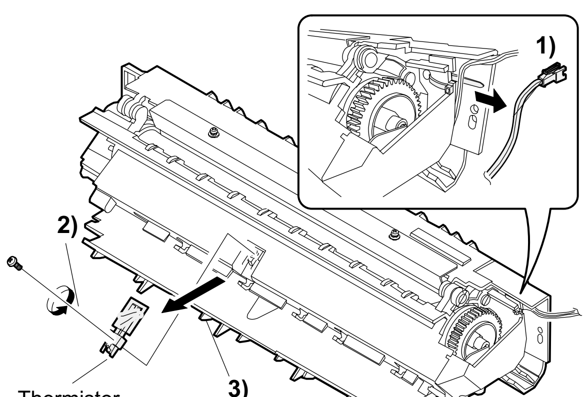
No.	Part name Ref.
1	Thermistor
2	PPD2 sensor
3	Heater lamp
4	Pressure roller
5	Heat roller

B. Disassembly procedure

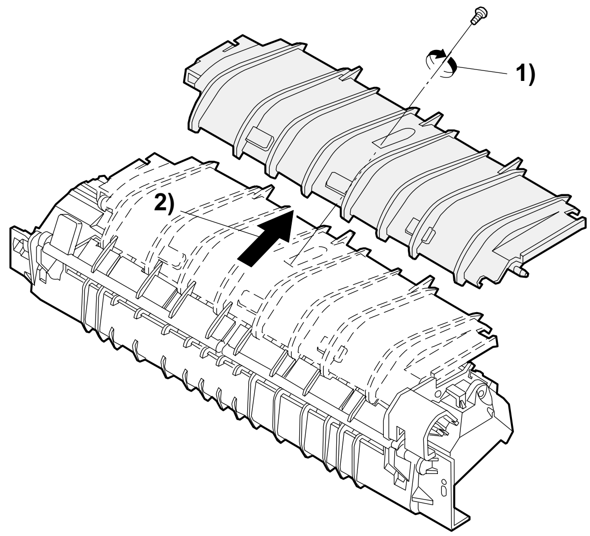
1) Remove the connectors (3 pcs.) of the rear cabinet.
2) Open the side cover, remove two screws, and remove the fusing unit.



3) Cut the binding band, remove the screw, and remove the thermistor.

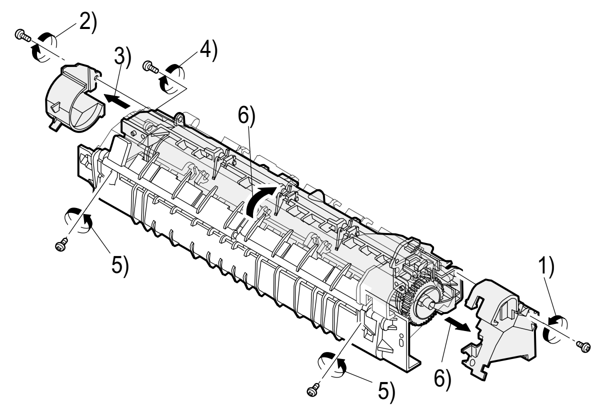


4) Remove the screw and remove the U-turn guide.

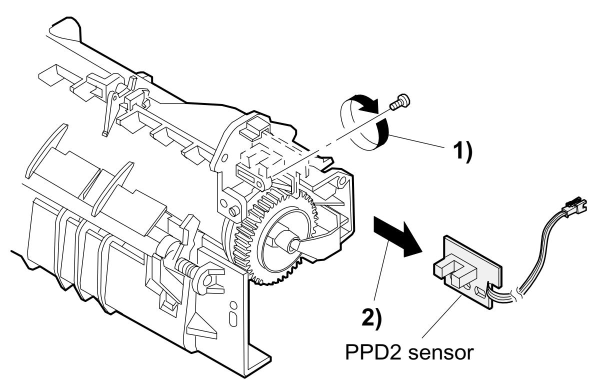


Pressure roller section disassembly

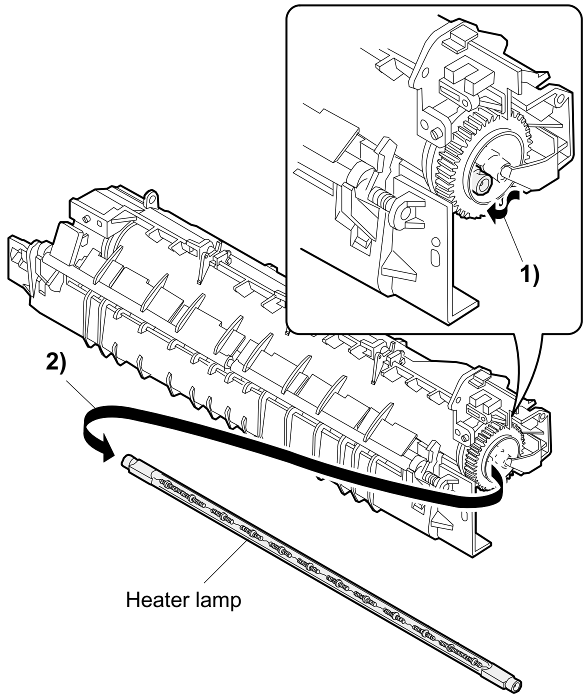
5) Remove the three screws, remove the fusing cover lower on the right side, and open the heat roller section.



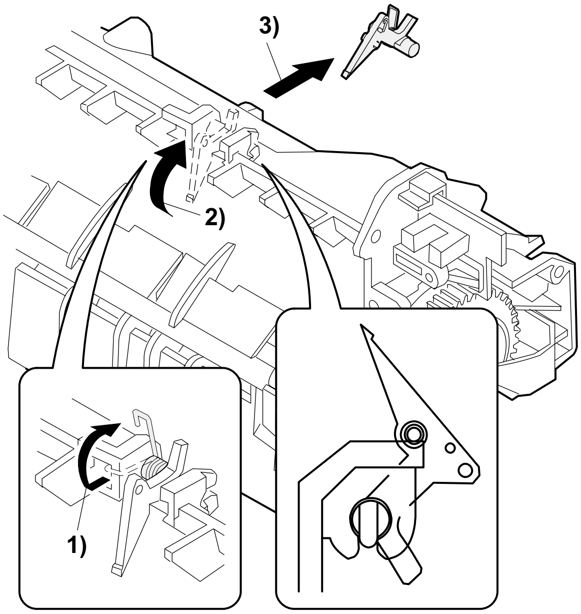
6) Remove the screw and remove the PPD2 sensor.



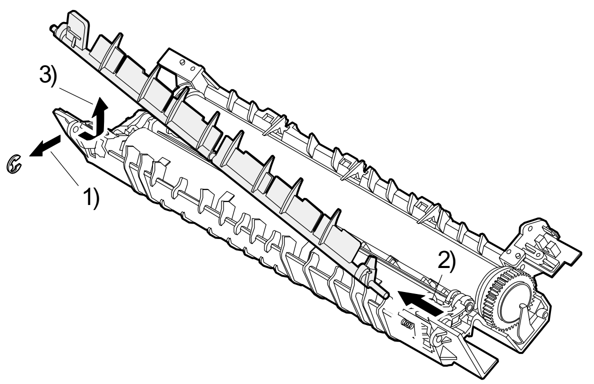
7) Remove the plate spring on the right and remove the heater lamp.



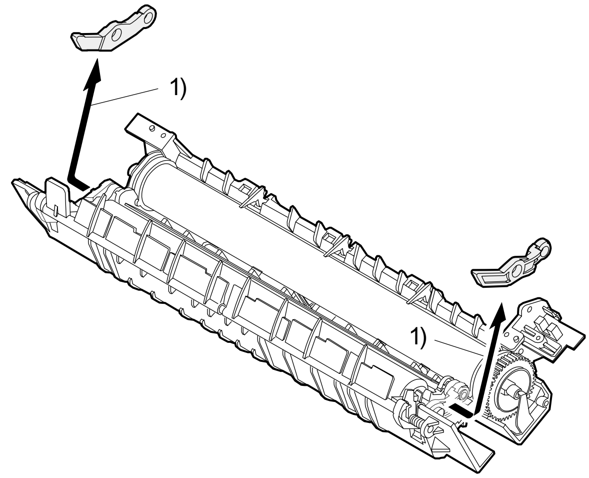
8) Remove the spring and remove the separation pawls (3 pcs.).



9) Remove the E-ring and remove the reverse gate.

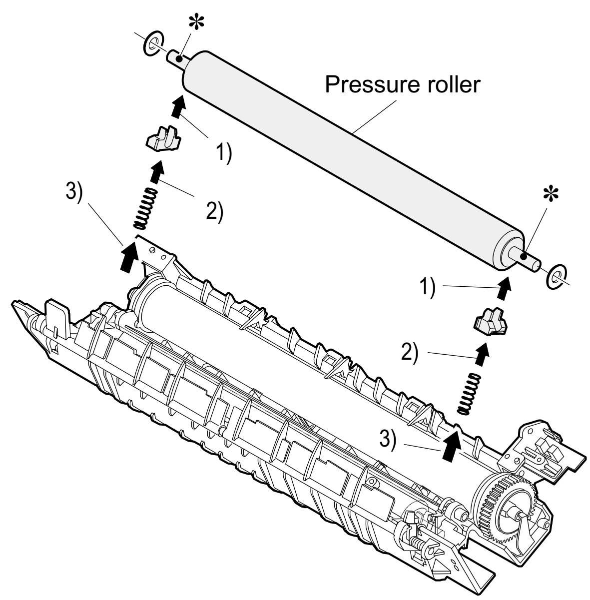


10) Remove the pressure release levers on the right and the left sides.



11) Remove the pressure roller, the pressure bearing, and the spring.

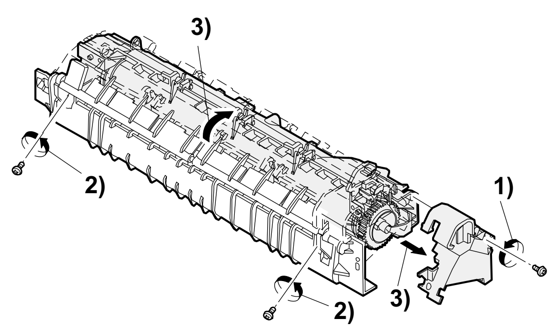
Note: Apply grease to the sections specified with an asterisk (*).
Grease: "JFE552" UKOG-0235FCZZ



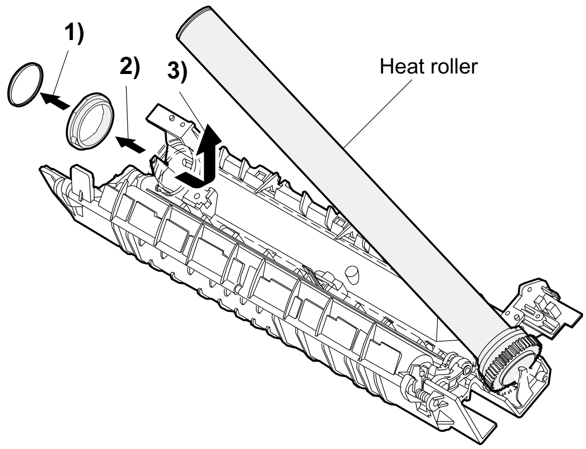
Heat roller disassembly

(Continued from procedure (4).)

5) Remove screws, remove the fusing cover, and open the heat roller section.

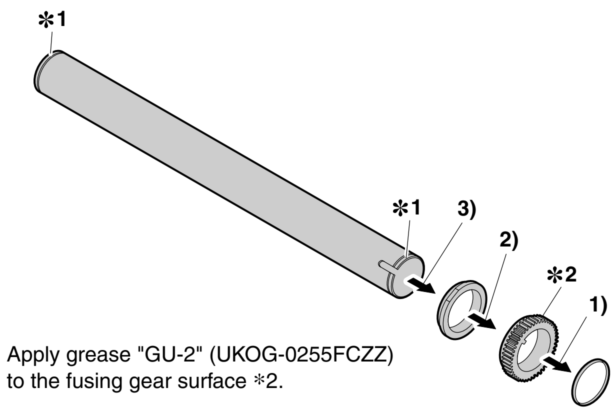


6) Remove the C-ring and the fusing bearing, and remove the heat roller.

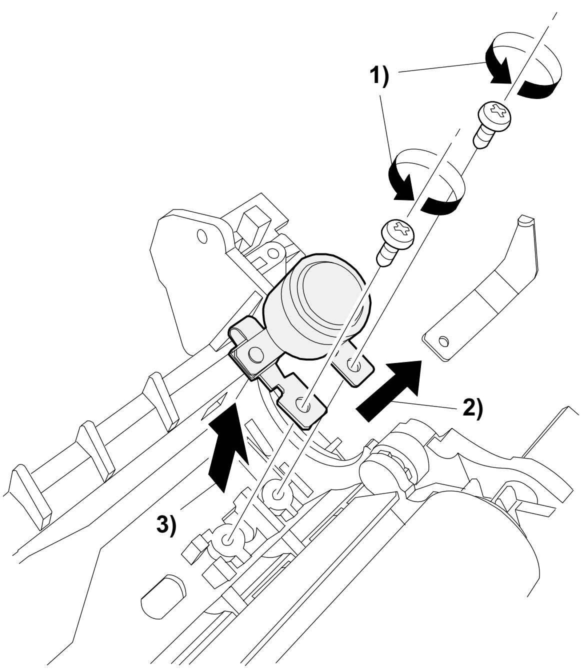


7) Remove the parts from the heat roller.

Note: Apply grease to the sections specified with ✻1.
Grease: "JFE552" UKOG-0235FCZZ



8) Remove two screws and remove the thermo unit.



C. Assembly procedure

For assembly, reverse the disassembly procedure.

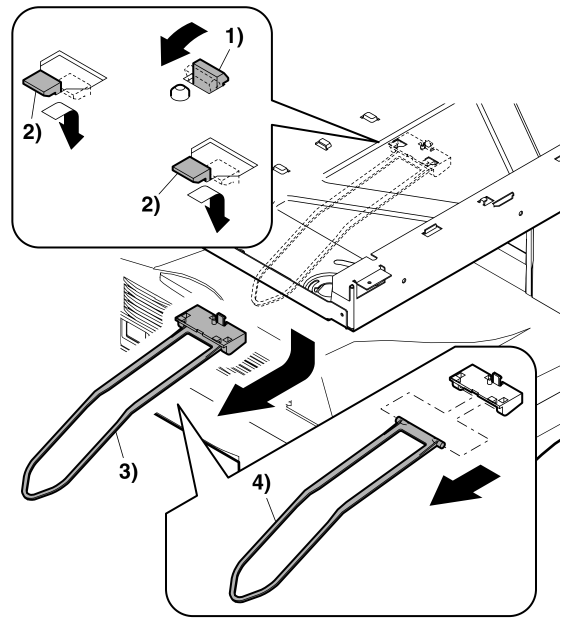
5. Tray paper feed/transport section

A. List

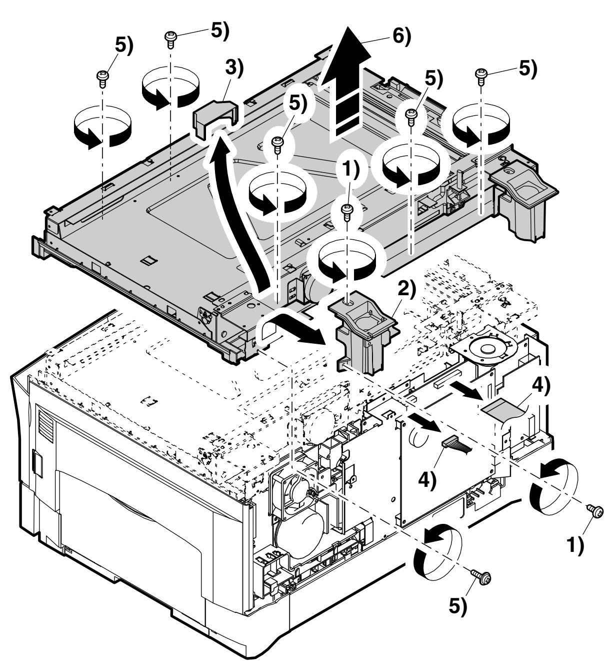
No.	Part name Ref.
1	Paper holding arm
2	PPD1 sensor PWB
3	LSU unit
4	Intermediate frame unit
5	Paper feed roller

B. Disassembly procedure

1) Remove the paper holding arm.
   Remove the arm holder from the main unit, and remove the holder from the arm.

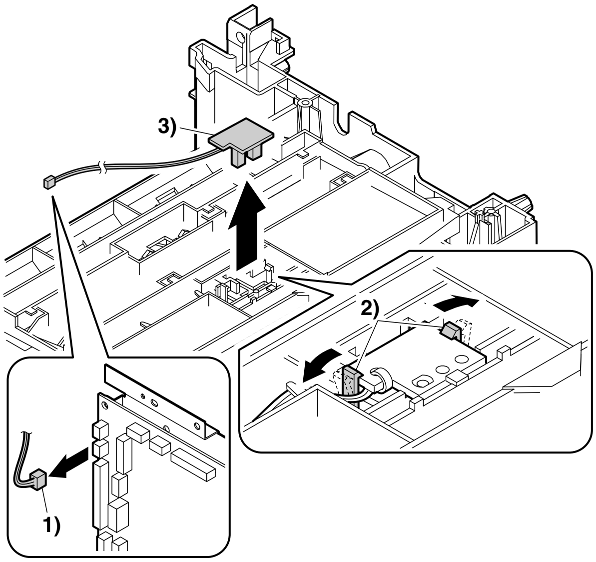


2) Remove the two screws, and remove the hinge guide R.
3) Remove the fan duct and disconnect the connector. (2 positions)
4) Remove the six screws, and remove the scanner unit.

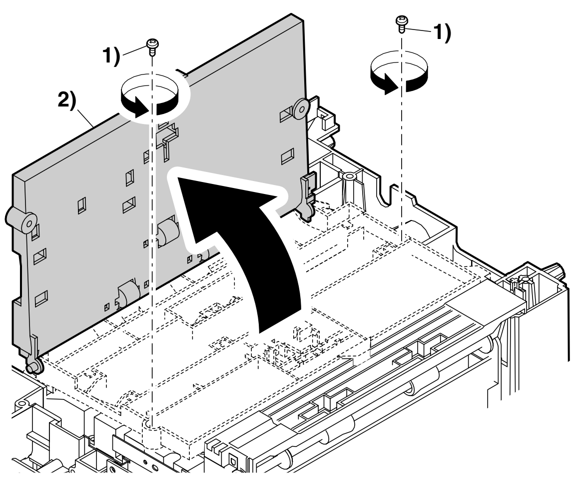


5) Disconnect the connector from the MCU PWB.

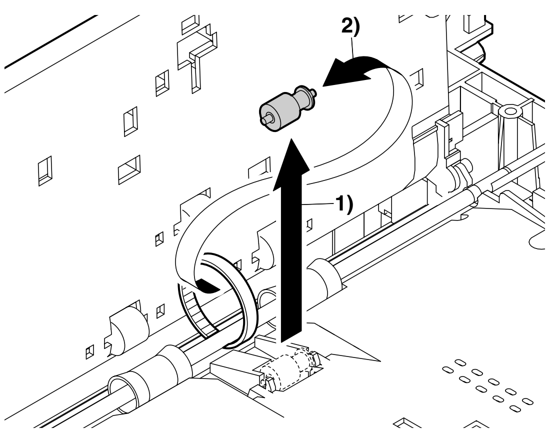
6) Disengage the pawls (2 positions), and remove the sensor PWB.



7) Remove the screw, and open the upper paper guide.

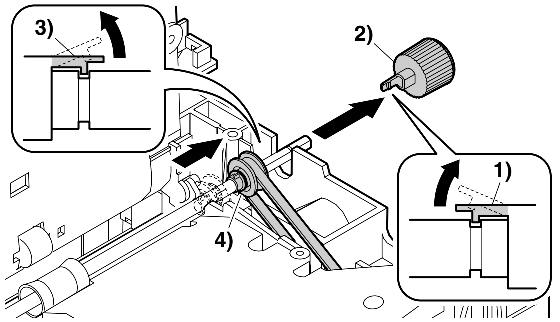


8) Remove the roller, and remove the belt.

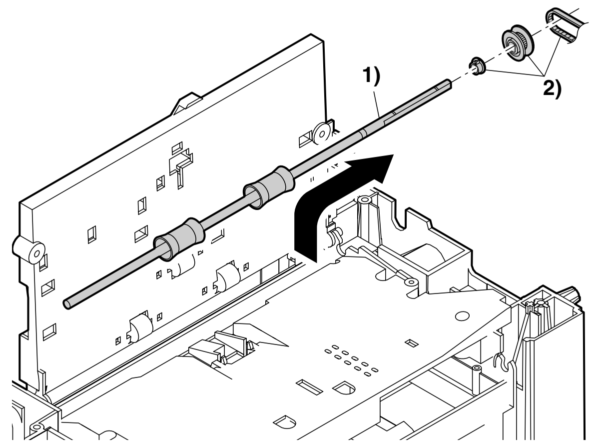


9) Disengage the pawl, and remove the roller knob.

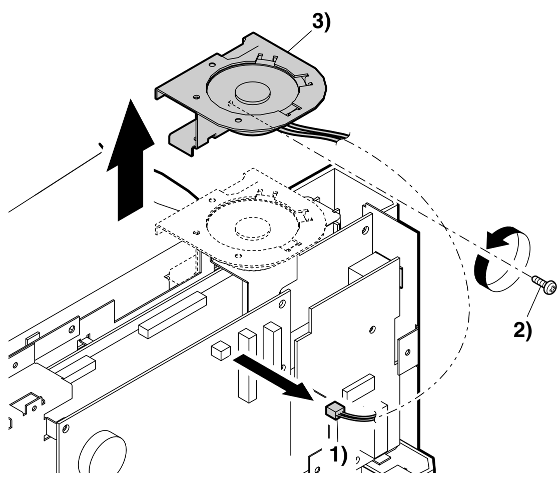
10) Disengage the pawl, and shift the pulley and the bearing.



11) Remove the paper exit roller, and remove the belt, the pulley, and the bearing.

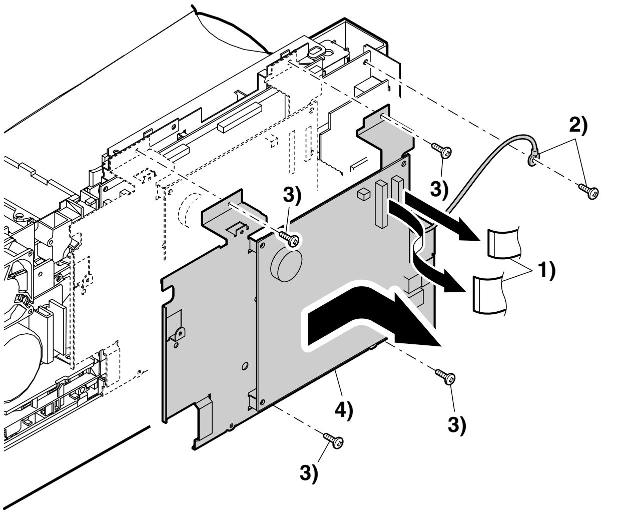


12) Remove the connector and the screw, and remove the speaker unit. (When the AR-FX9 is installed)



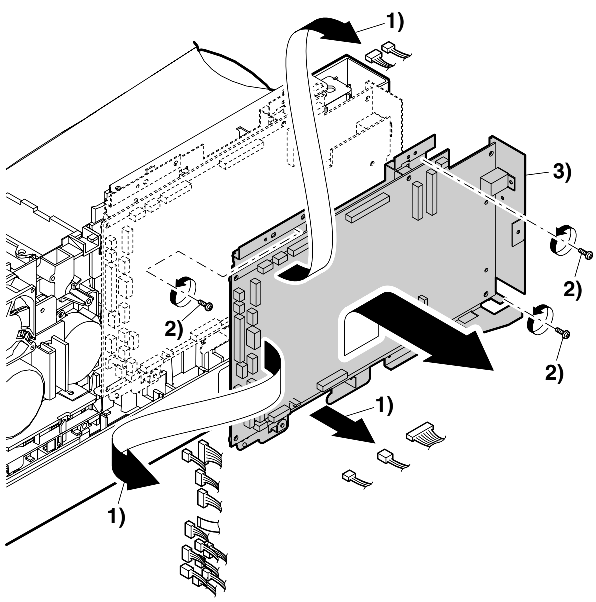
13) Remove the flat cable and the grounding wire.

14) Remove the four screws, and remove the FAX PWB unit. (When the AR-FX9 is installed)

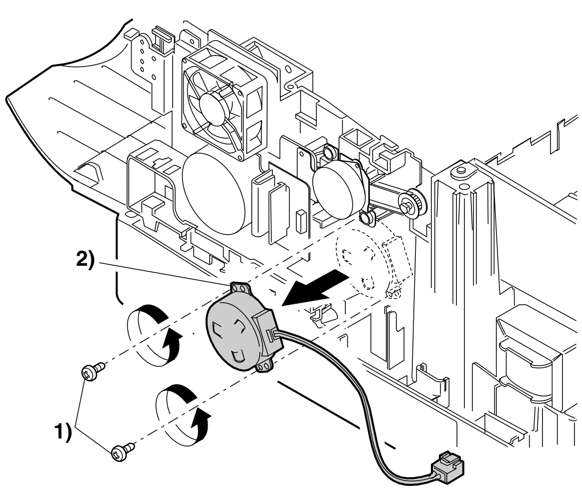


15) Disconnect the connectors.

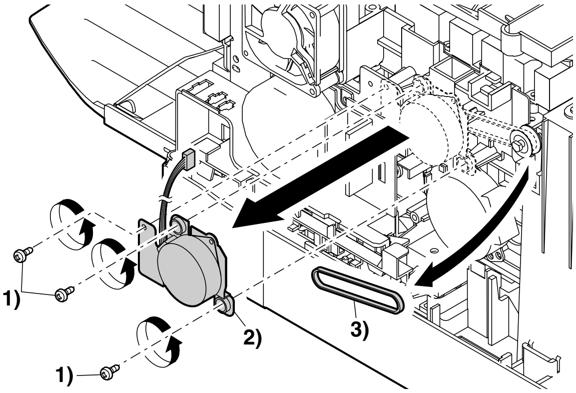
16) Remove the three screws, and remove the MCU PWB.



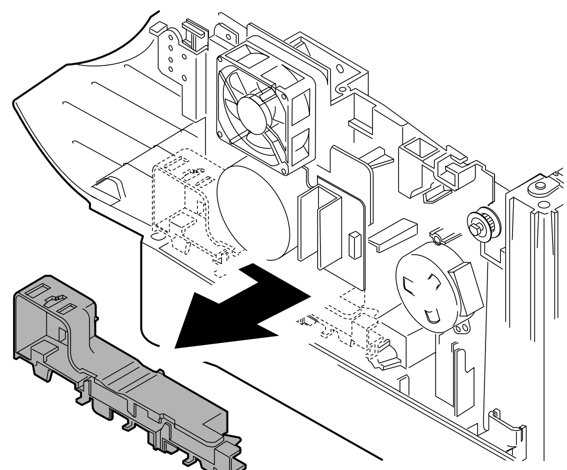
17) Remove two screws and remove the toner motor.



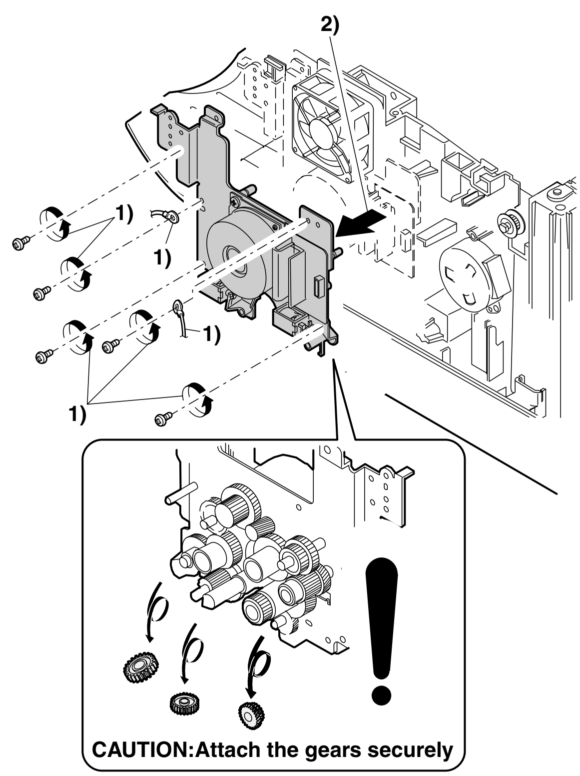
18) Remove the three screws, and remove the DUP motor unit and the belt.



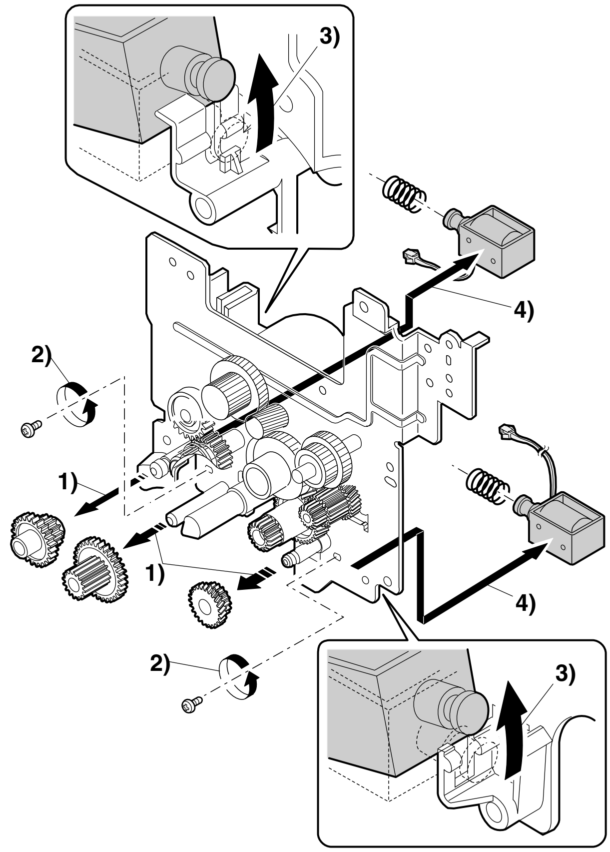
19) Remove the harness guide.



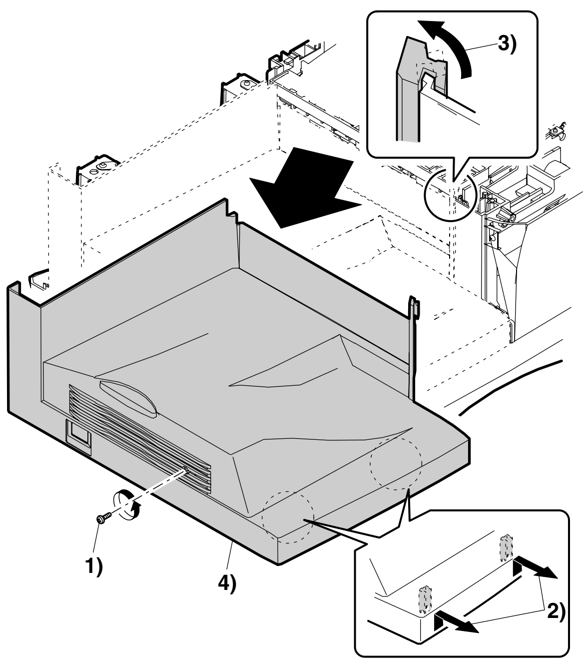
20) Remove the five screws and the grounding wire, and remove the main drive unit.



21) Remove the parts as shown below, and remove the pressure release solenoid and the paper feed solenoid.

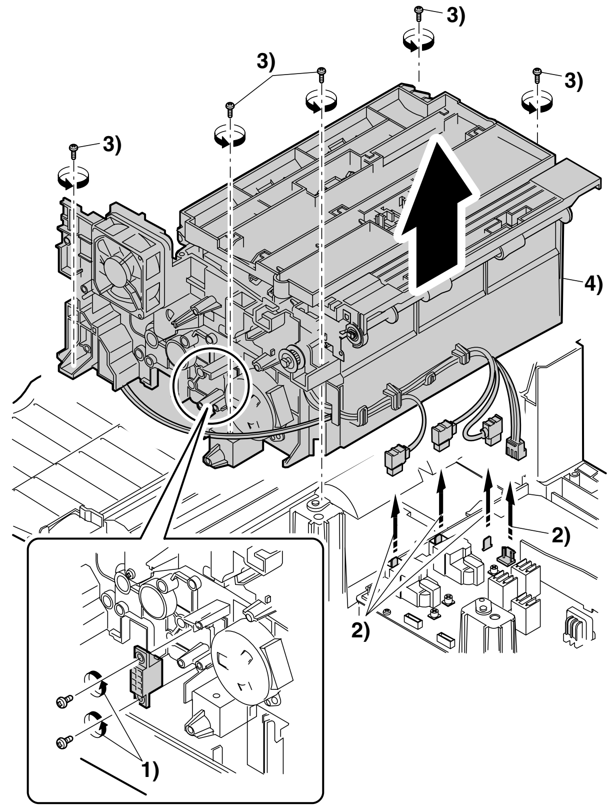


22) Remove each pawl, and remove the paper exit tray.



23) Remove two screws and remove the fusing connector.

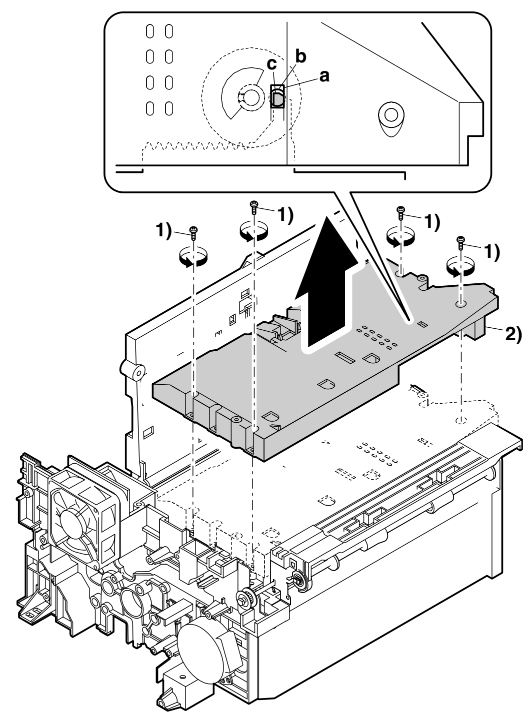
24) Remove five screws and the connector, and lift the intermediate frame unit to remove.



25) Remove the four screws, and remove the lower paper guide unit.

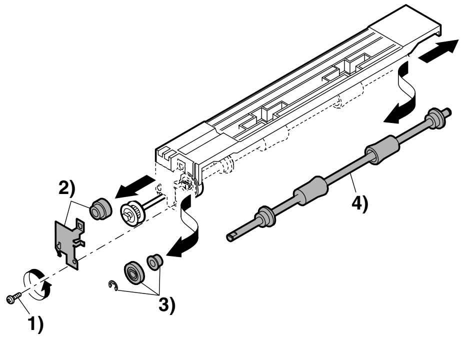
[Note for installation]

Fit the lower paper guide hole (a) with the shifter gear hole (b) so that the black resin (c) of the shifter unit can be checked.



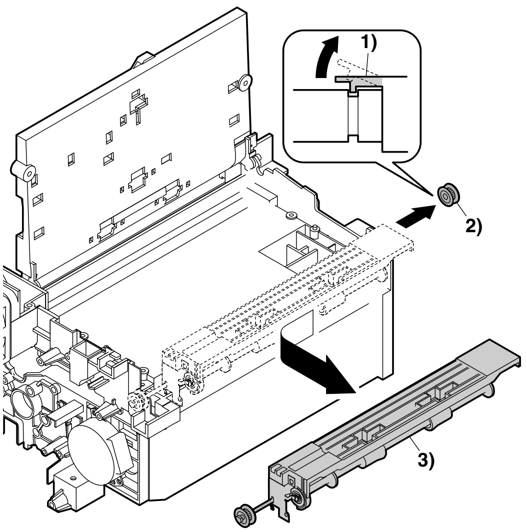
26) Disengage the pawl, and remove the pulley.

27) Shift and remove the shifter unit.

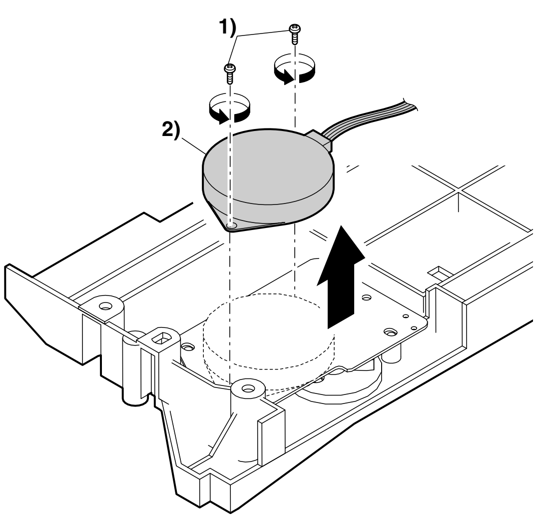


28) Remove the screw, and remove the grounding plate and the gear.

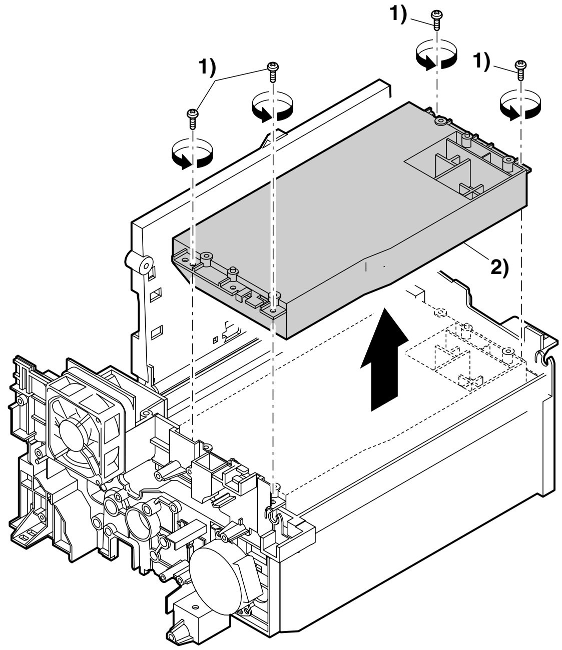
29) Remove the E-ring, the gear, and the bearing, and remove the shifter roller.



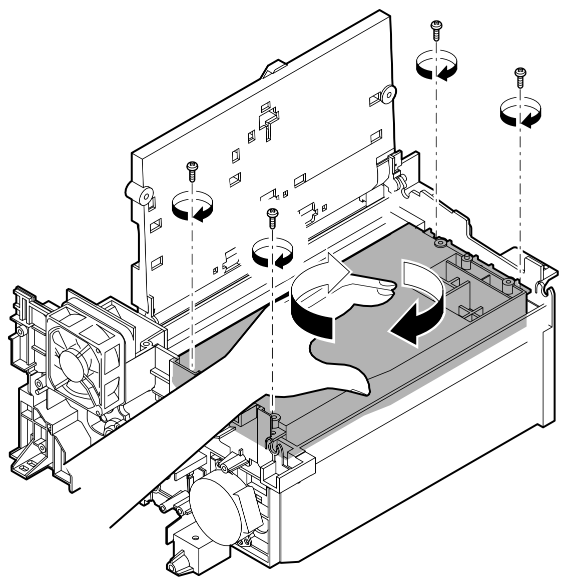
30) Put the lower paper guide unit upside down, remove the two screws, and remove the shifter motor.



31) Remove the four screws, and remove the LSU.

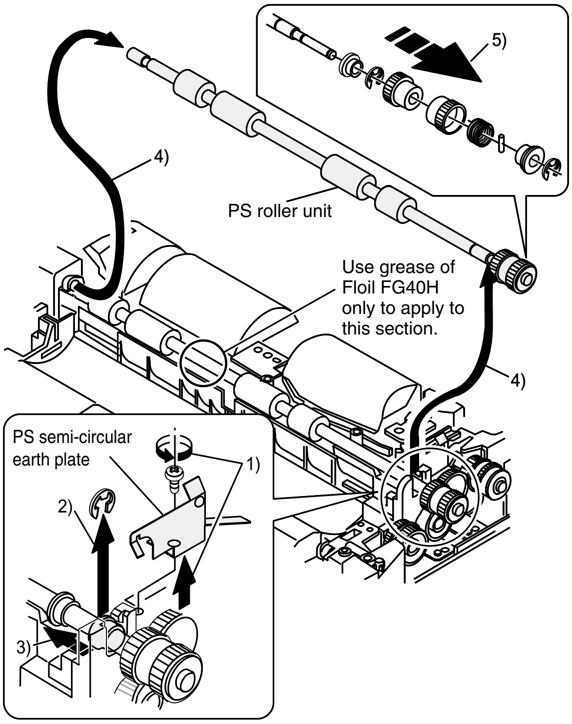


Note: When assembling, turn it to the right and attach.

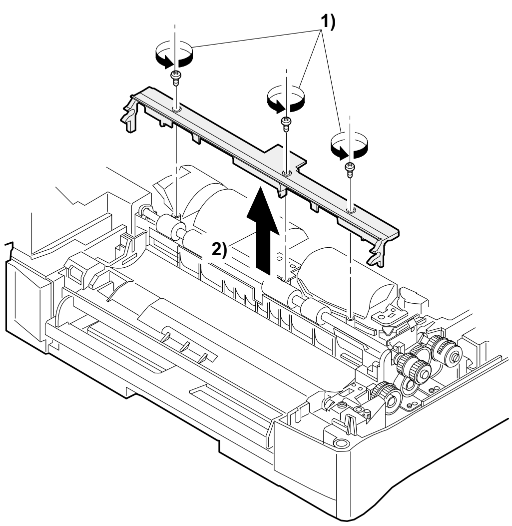


32) Remove the screw and the E-ring, and remove the PS semi-circular earth plate and the PS roller unit.

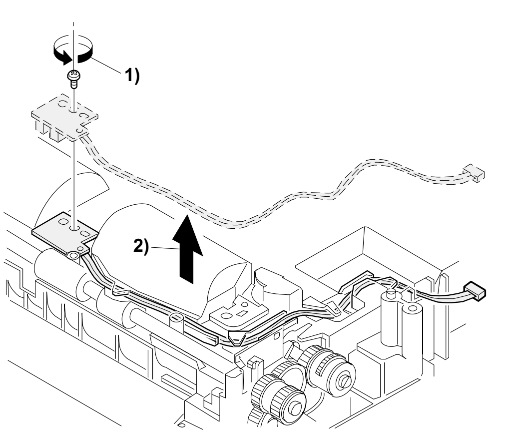
33) Remove the E-ring and remove the spring clutch from the PS roller unit.



34) Remove three screws and remove the TC front paper guide.

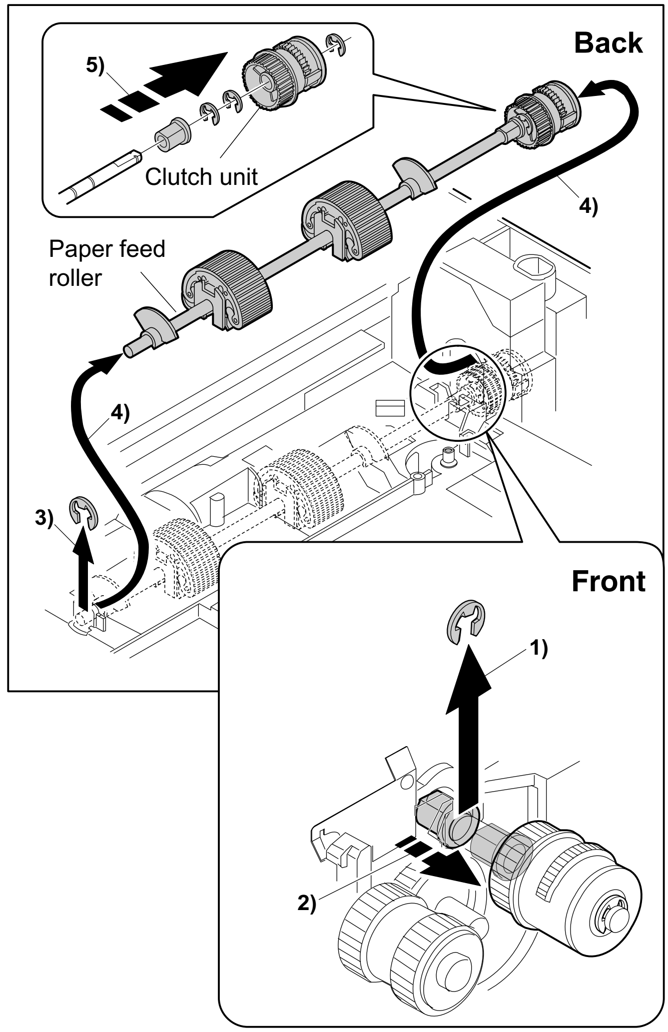


35) Remove the screw and the connector, and remove the PPD1 sensor PWB.



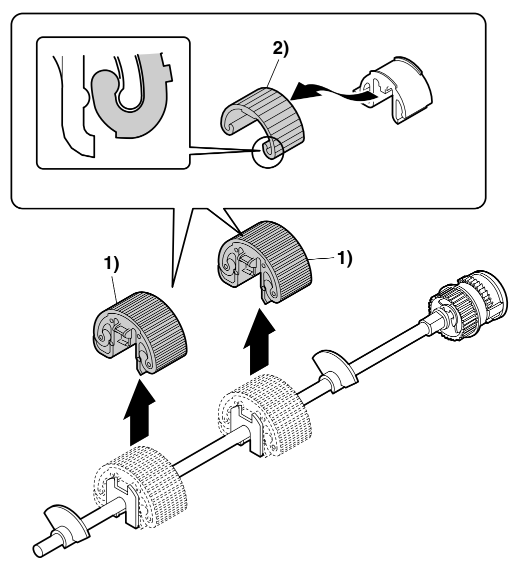
36) Remove two E-rings and remove the paper feed roller.

37) Remove three E-rings and remove the clutch unit.



38) Remove the semi-circular roller unit.

39) Remove the semi-circular rubber.



C. Assembly procedure

For assembly, reverse the disassembly procedure.

6. Manual paper feed section

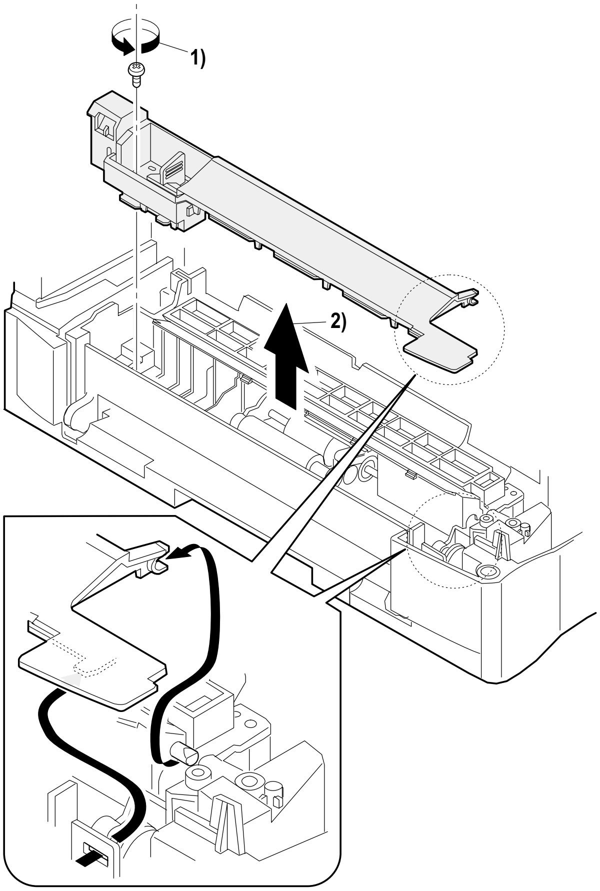
A. List

No.	Part name Ref.
1	Manual transport roller
2	Cassette detection switch
3	PPD1 sensor PWB
4	Side door detection unit

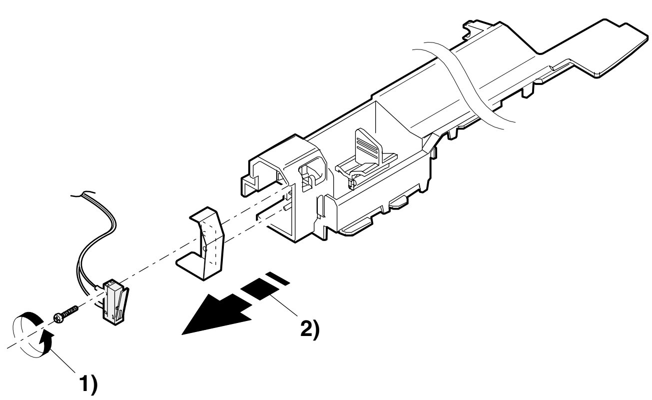
B. Disassembly procedure

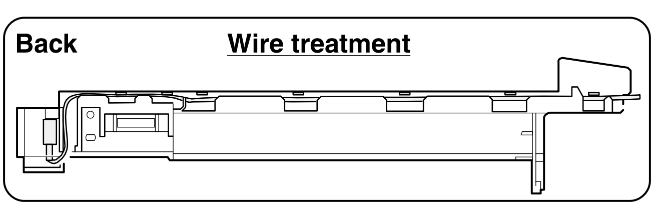
Multi unit

1) Remove the screw and remove the multi upper cover.

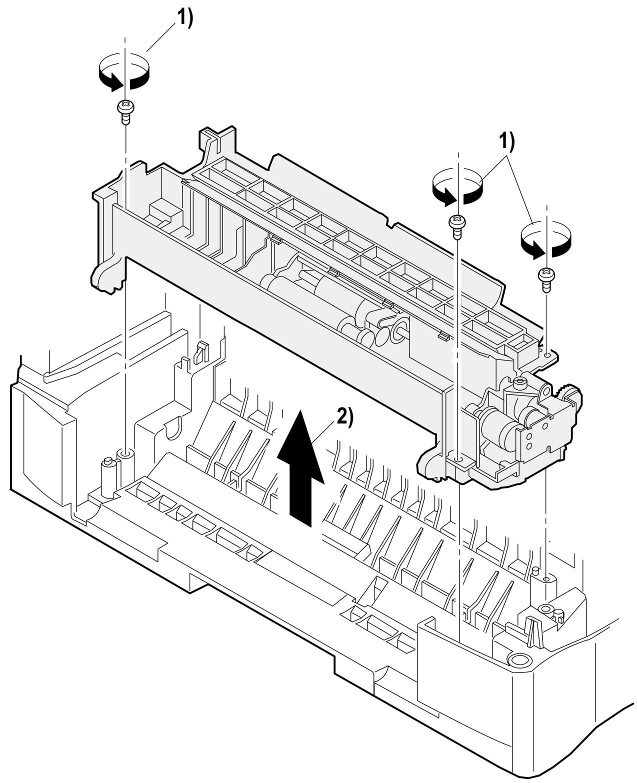


2) Remove the screw and remove the side door detection unit.

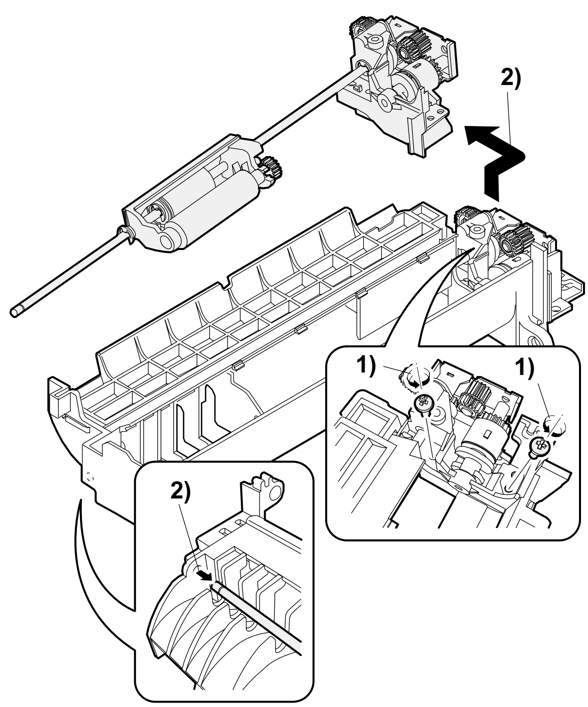




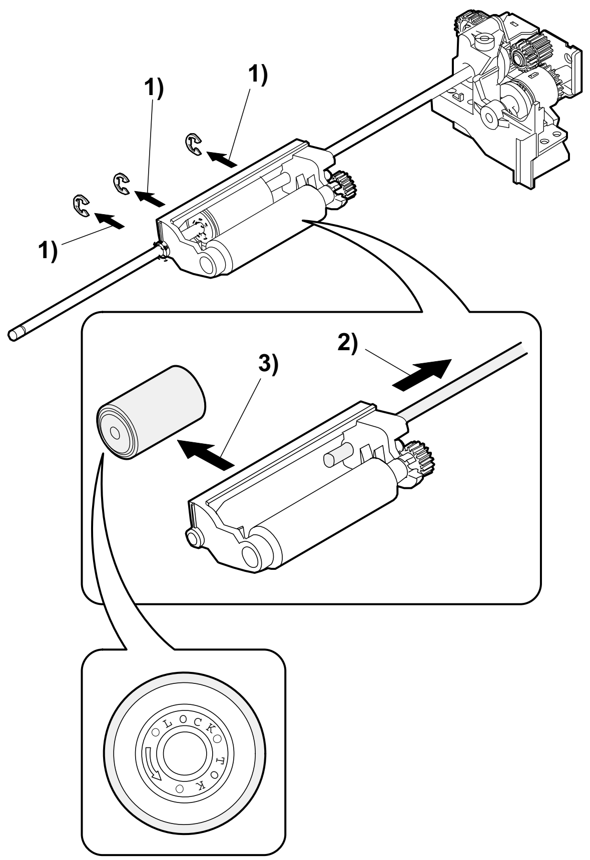
3) Remove three screws and remove the multi paper feed upper frame.



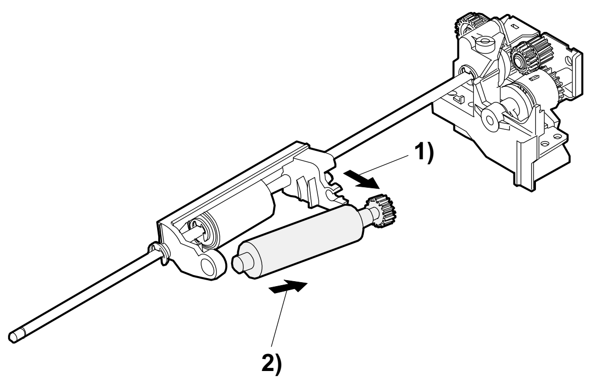
4) Remove two screws and remove the multi feed bracket unit from the multi paper feed upper frame.



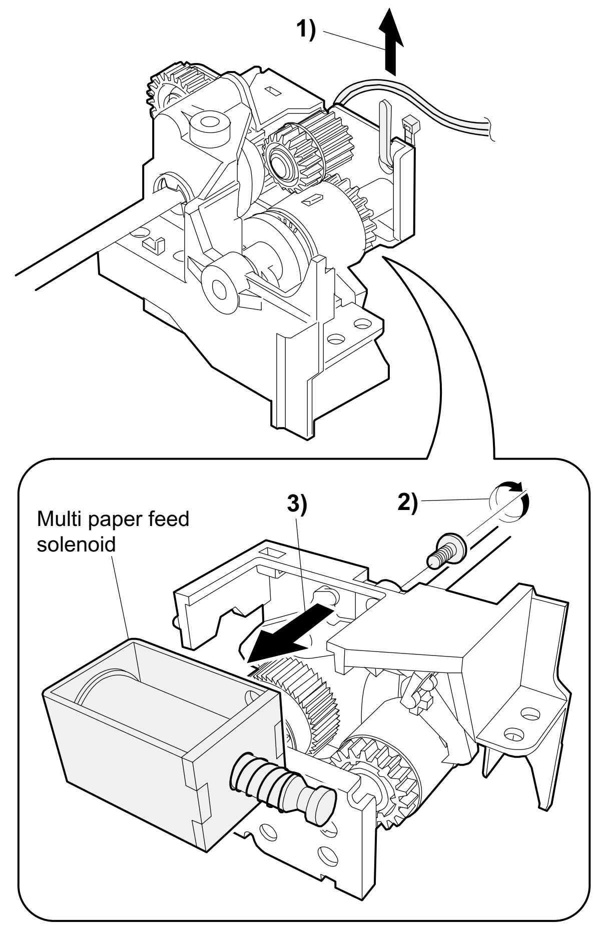
5) Remove three E-rings and remove the manual paper feed roller B9.



6) Remove the pick-up roller.



7) Cut the binding band and remove the multi paper feed solenoid.

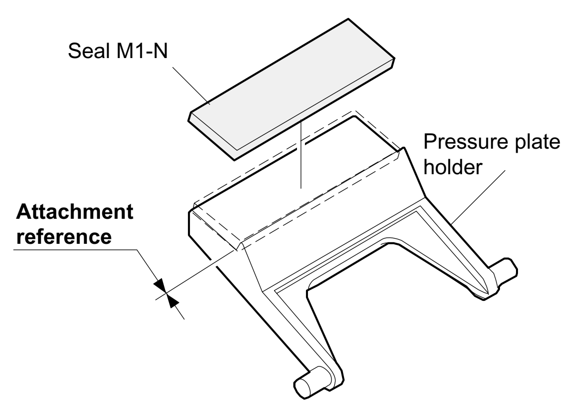


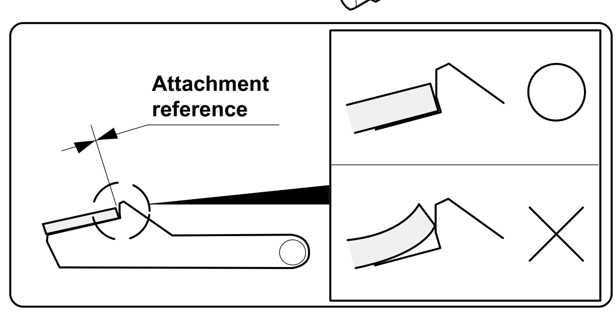
C. Assembly procedure

For assembly, reverse the disassembly procedure.

D. Pressure plate holder attachment

1) Attach the pressure plate holder so that the resin section is not covered with the seal M1-N.





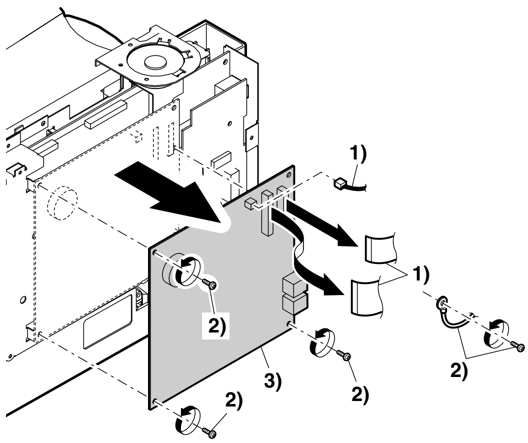
7. Rear frame section

A. List

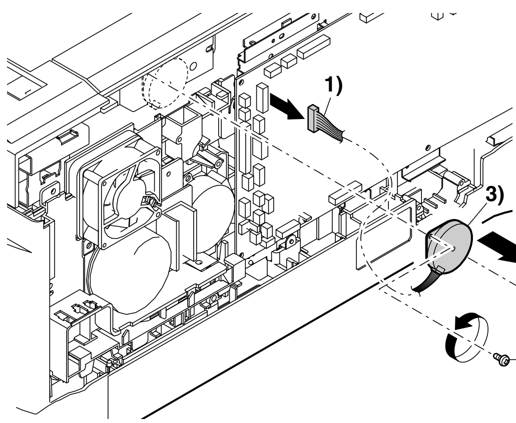
No.	Part name Ref.
1	FAX PWB (When the AR-FX9 installed)
2	Mirror motor
3	Main motor
4	Exhaust fan motor
5	Main PWB

B. Disassembly procedure

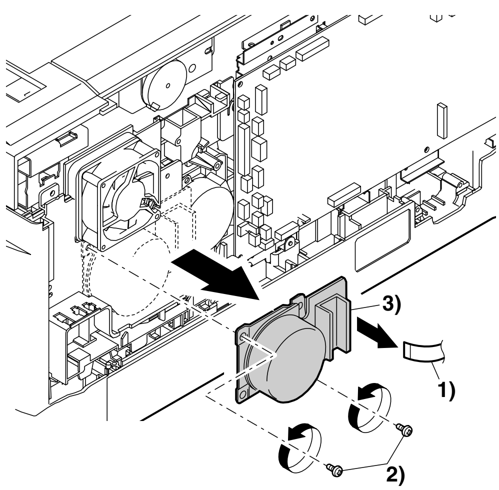
1) Remove the rear cabinet.
2) Remove the connector, the flat cable, and the grounding wire.
3) Remove three screws, and remove the FAX PWB.



4) Disconnect the connector.
5) Remove two screws, and remove the scanner motor.

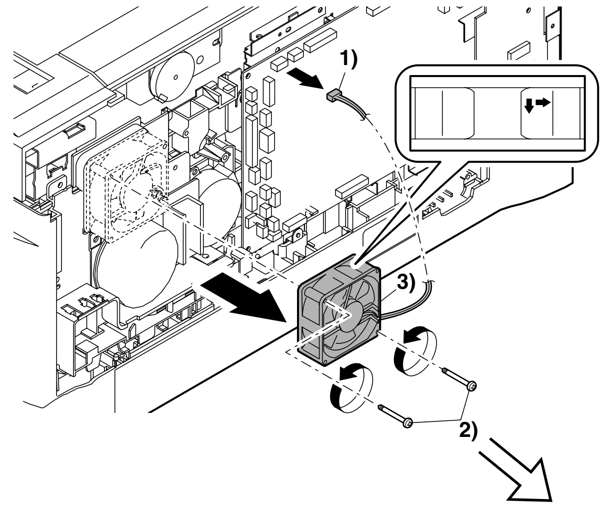


6) Remove two screws and one harness, and remove the main motor.

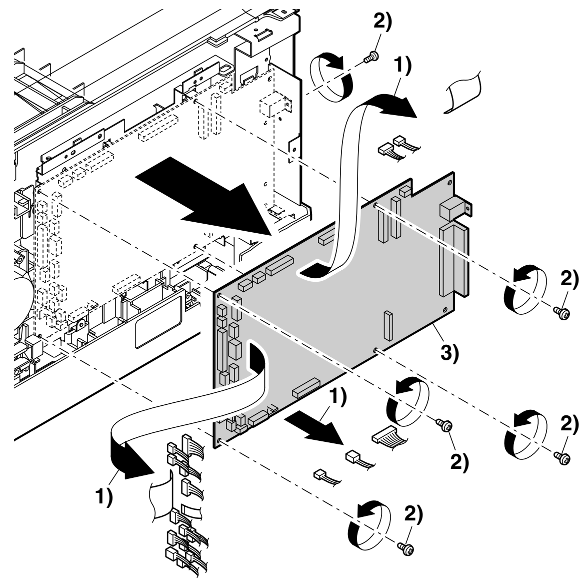


7) Remove two screws and one connector, and remove the exhaust fan motor.

Note: Be careful of the installing directions of the fan.
Attach it so that the blowing direction faces outside.



8) Disconnect the connectors.
9) Remove the five screws, and remove the MCU PWB.



C. Assembly procedure

For assembly, reverse the disassembly procedure.

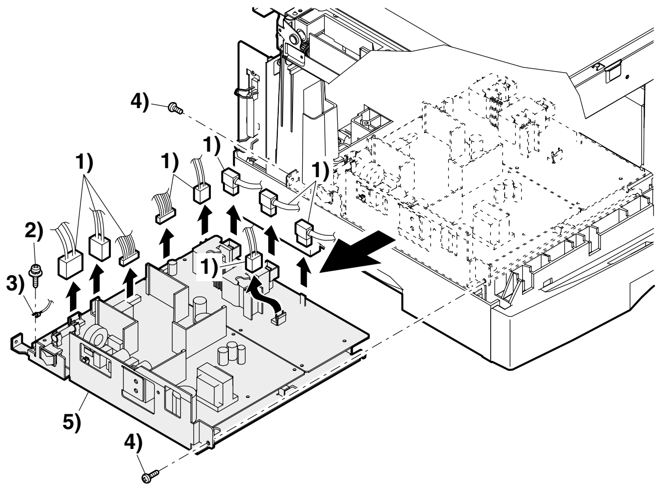
8. Power section

A. List

No.	Part name Ref.
1	Power PWB

B. Disassembly procedure

1) Disconnect each connector.
2) Remove the screw, and remove the earth line.
3) Remove two screws, and remove the power PWB unit.



C. Assembly procedure

For assembly, reverse the disassembly procedure.

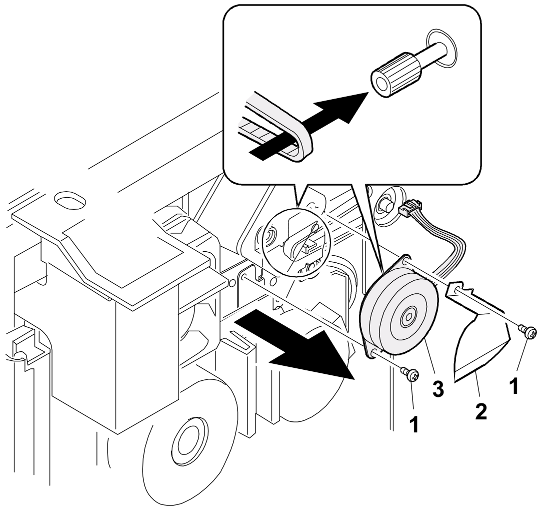
9. Duplex motor section

A. List

No.	Part name Ref.
1	Duplex motor

B. Disassembly procedure

1) Remove the rear cabinet.
2) Remove two screws.
3) Remove the Duplex motor cover.
4) Remove the Duplex motor.



Note: When reassembling, be sure to engage the Duplex motor gear with the belt on the main body side.

C. Assembly procedure

For assembly, reverse the disassembly procedure.

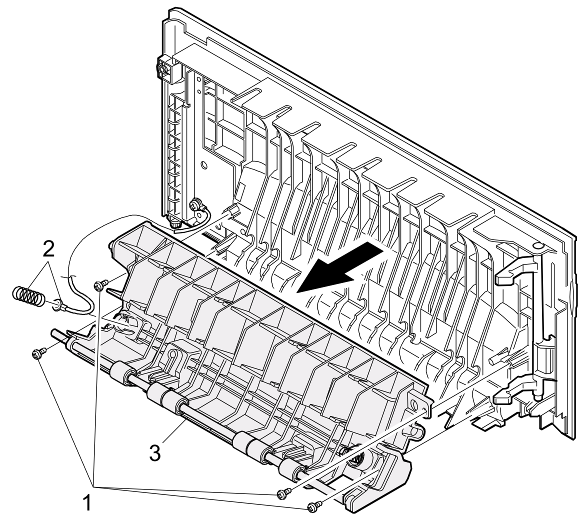
10. Reverse roller section (RSPF model only)

A. List

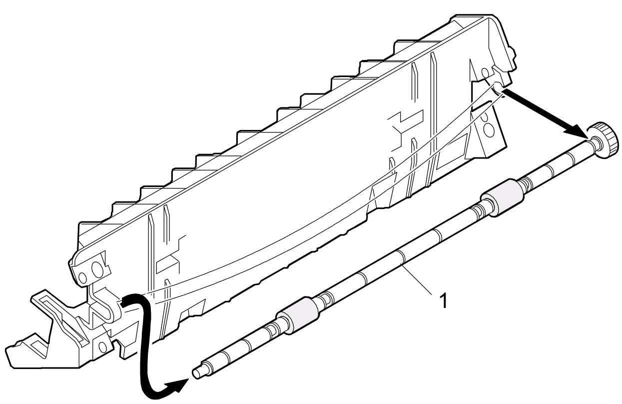
No.	Part name Ref.
1	Reverse roller

B. Disassembly procedure

1) Remove four screws
2) Remove the spring, and the earth wire
3) Remove the reverse unit.



4) Bend the reverse roller and remove it.



C. Assembly procedure

For assembly, reverse the disassembly procedure.

11. RSPF section (RSPF model only)

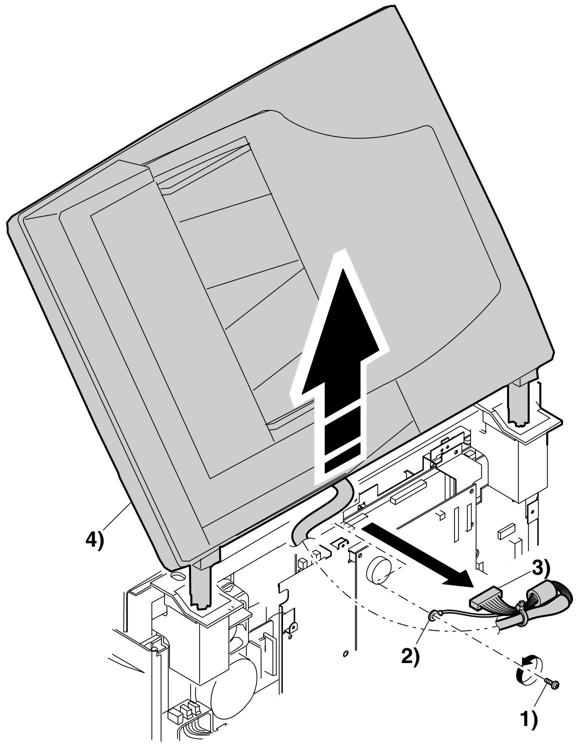
A. RSPF

(1) Remove the rear cabinet.

1) Remove four screws.
2) Remove the rear cabinet.

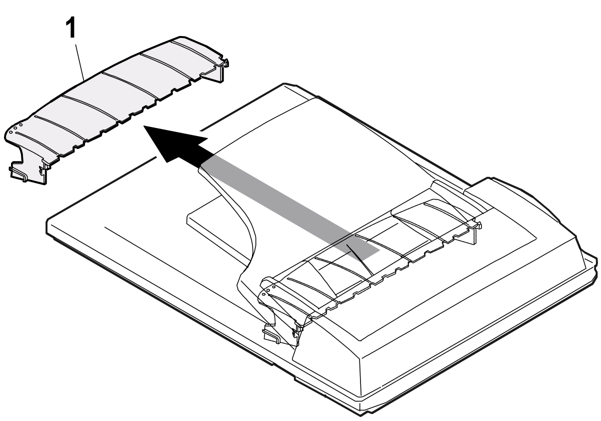
(2) Remove the RSPF.

1) Remove the connector and the cable.
2) Remove the RSPF.



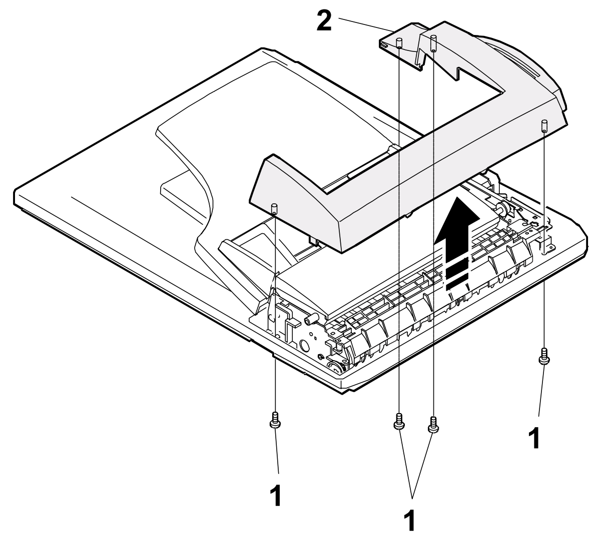
B. Intermediate tray

1) Remove the intermediate tray.



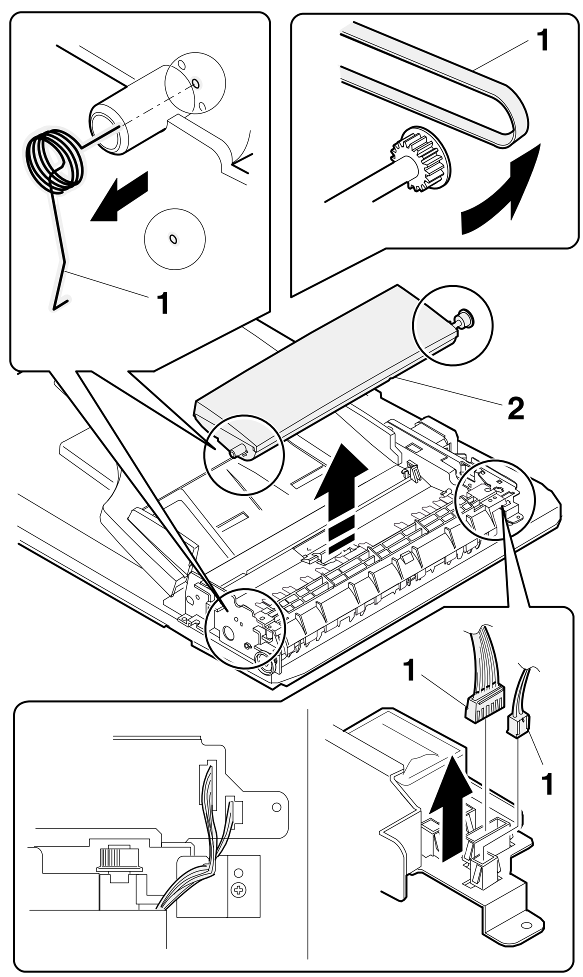
C. Upper cover

1) Remove four screws from the bottom of the main body.2)Remove the upper cover.



D. Pickup unit

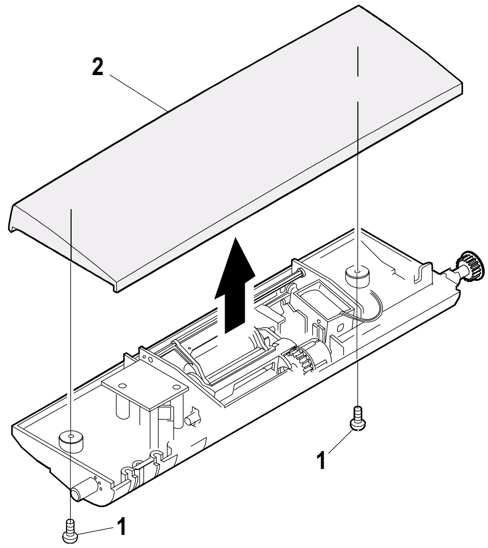
1) Remove the belt, the paper feed frame spring, and two harnesses.
2) Remove the pickup unit.



Note: When reassembling, be careful of the hole position for the paper feed frame spring.

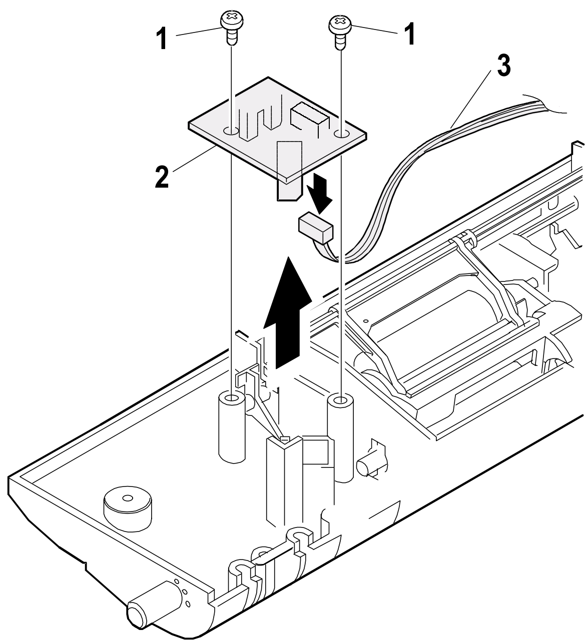
E. Upper cover of the pickup unit.

1) Remove two screws from the bottom of the pickup unit.
2) Remove the upper cover.



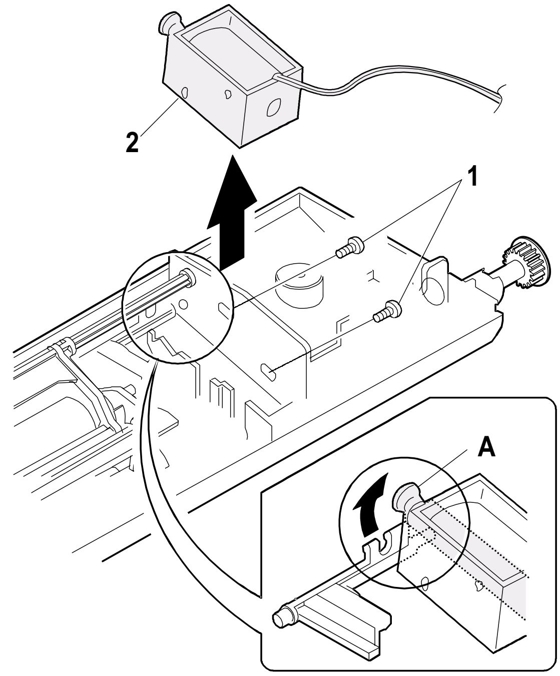
F. Sensor PWB

1) Remove two screws.
2) Remove the sensor PWB.
3) Remove the harness.



G. Pickup solenoid

1) Remove two screws.
2) Remove the pickup solenoid.

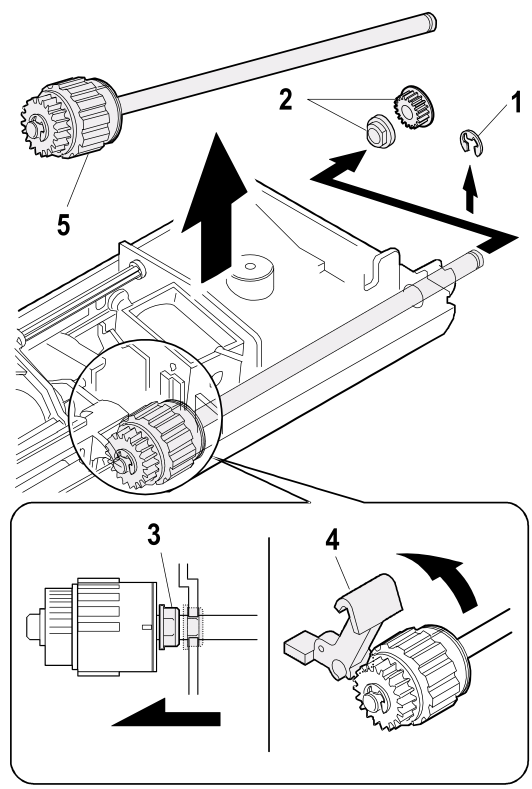


Note: When reassembling, hang the iron core on the solenoid arm.

H. Clutch

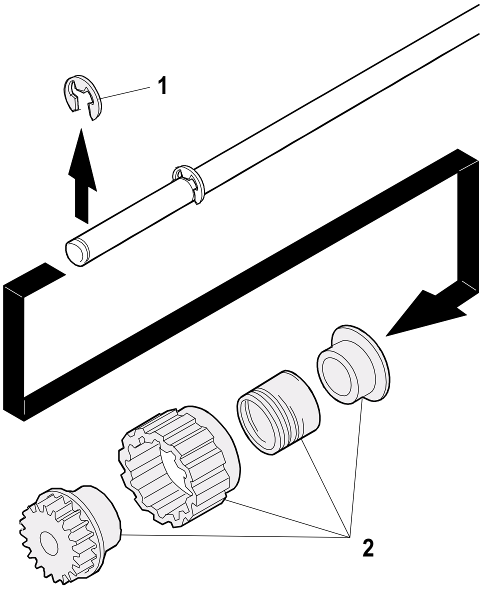
(1) Remove the clutch unit.

1) Remove the E-ring.
2) Remove the pulley and the bush.
3) Slide the bush in the arrow direction.
4) Lift the clutch pawl.
5) Remove the clutch unit.



(2) Remove the clutch

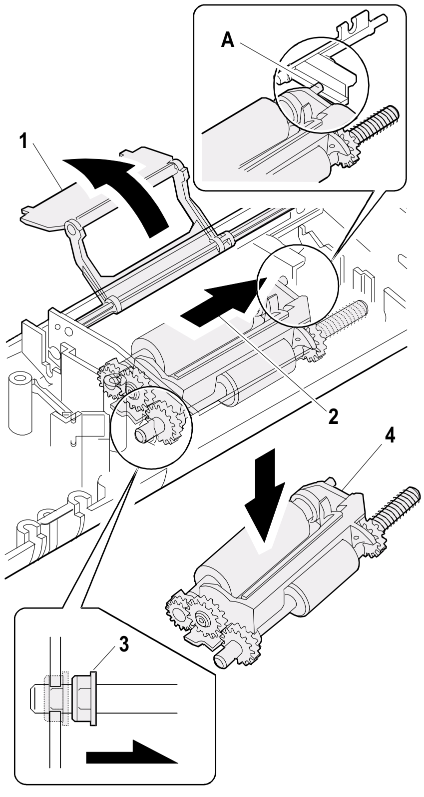
1) Remove the E-ring.
2) Remove the parts.



I. Manual paper feed roller, pickup roller

(1) Remove the pickup unit.

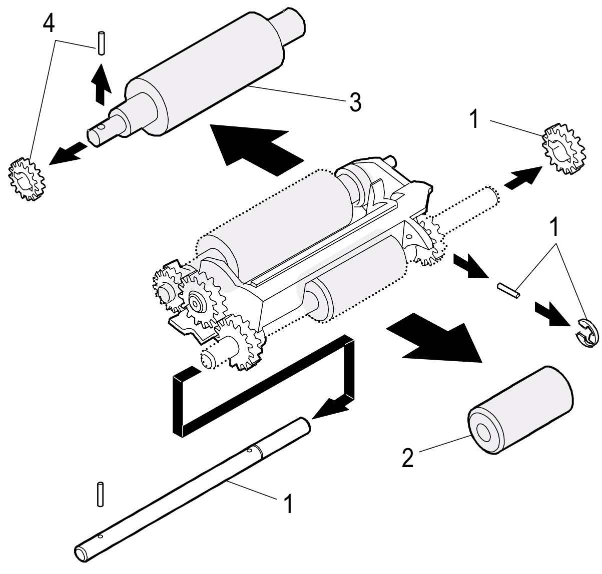
1) Lift the paper stopper.
2) Slide the take-up roller unit.
3) Slide the bushing in the arrow direction.
4) Remove the take-up roller.



Note: When reassembling, hang the convex portion of the roller unit on the solenoid arm.

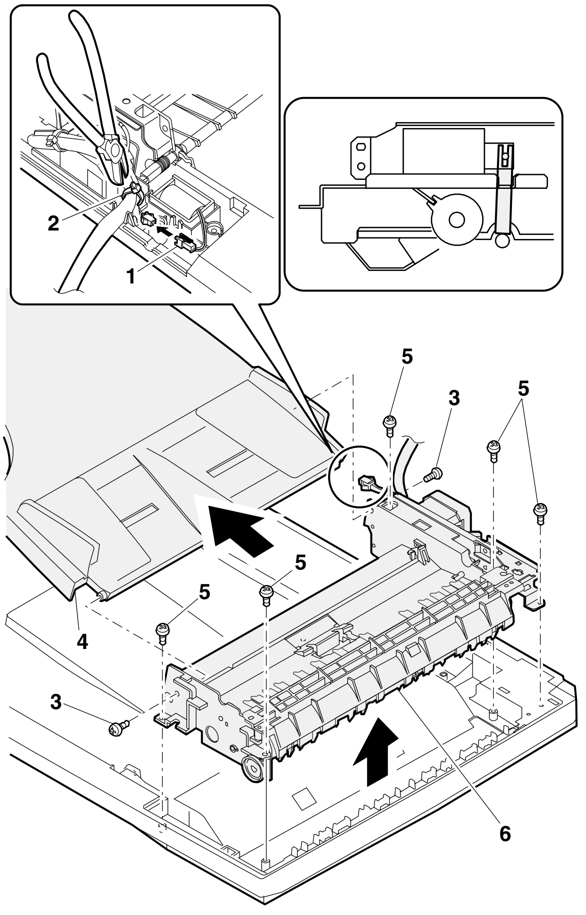
(2) Remove the Manual paper feed roller, pickup roller.

1) Remove the parts.
2) Remove the manual paper feed roller.
3) Remove the pickup roller.
4) Remove the parts.



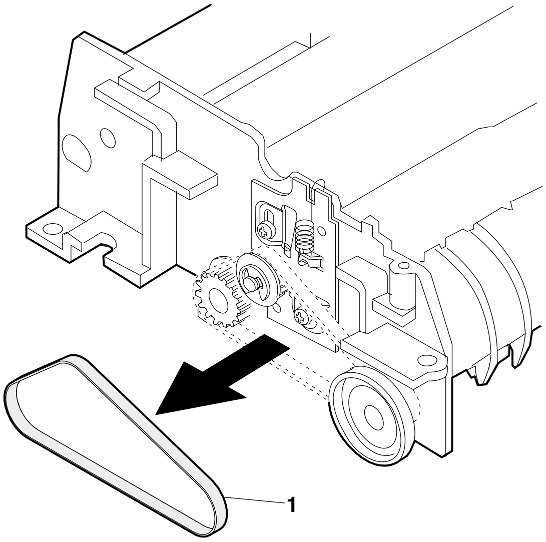
J. Transport unit removal

1) Disconnect the connector, and cut the binding band.
2) Remove two screws, and remove the document tray unit.
3) Remove five screws, and remove the transport unit.



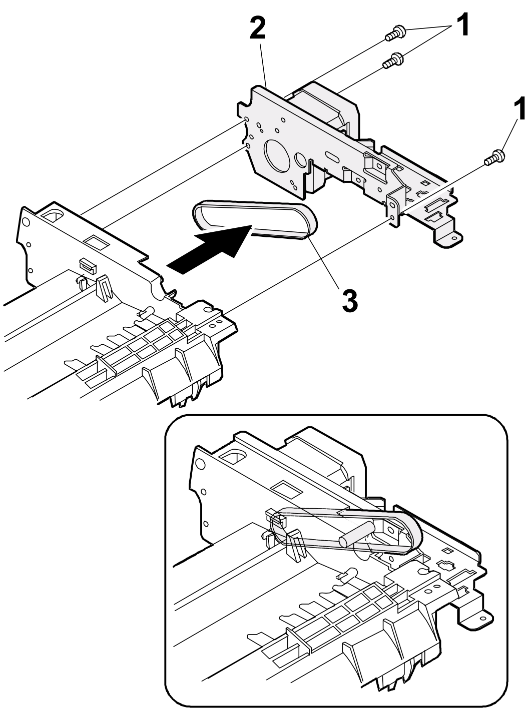
K. Belt 1

1) Remove the belt.



L. Belt 2

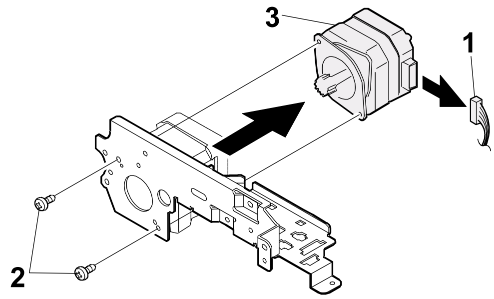
1) Remove three screws.
2) Remove the drive unit.
3) Remove the belt.



Note: When reassembling, hang the belt on the boss.

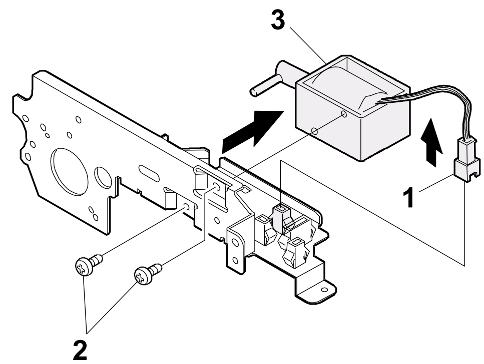
M. SPF motor

1) Remove the harness.
2) Remove two screws.
3) Remove the SPF motor.



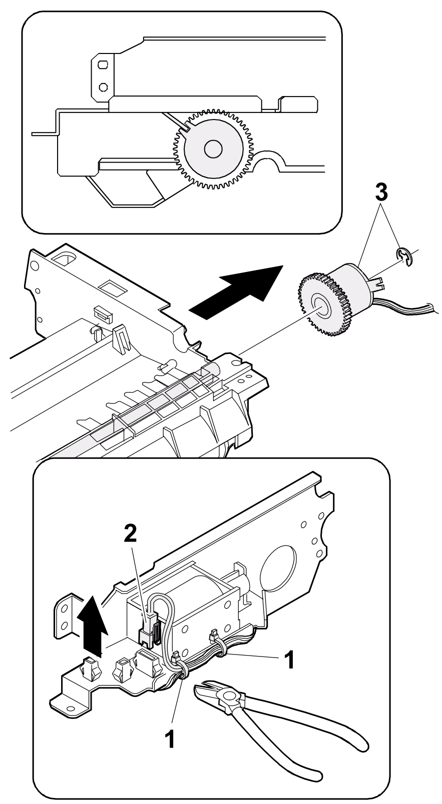
N. Solenoid

1) Remove the harness.
2) Remove two screws.
3) Remove the solenoid.



O. Clutch

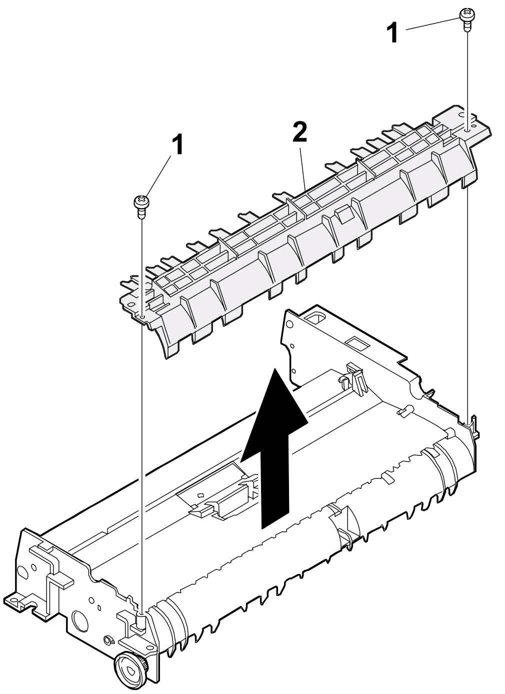
1) Cut the band with nippers.
2) Remove the harness.
3) Remove the clutch.



P. Paper supply roller

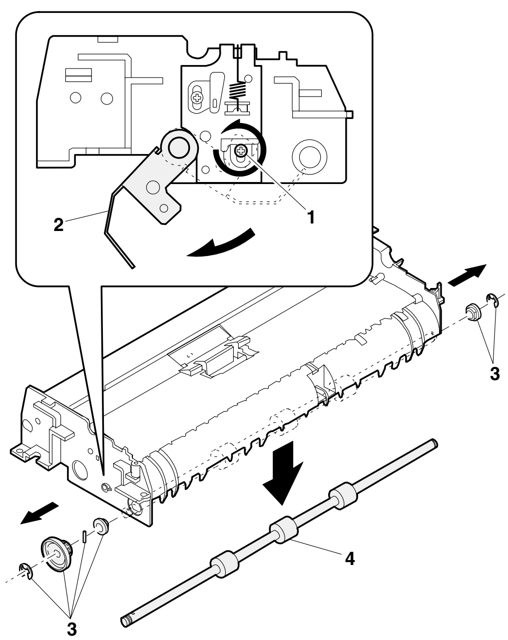
(1) Remove the parts.

1) Remove the two screws.
2) Remove the parts.



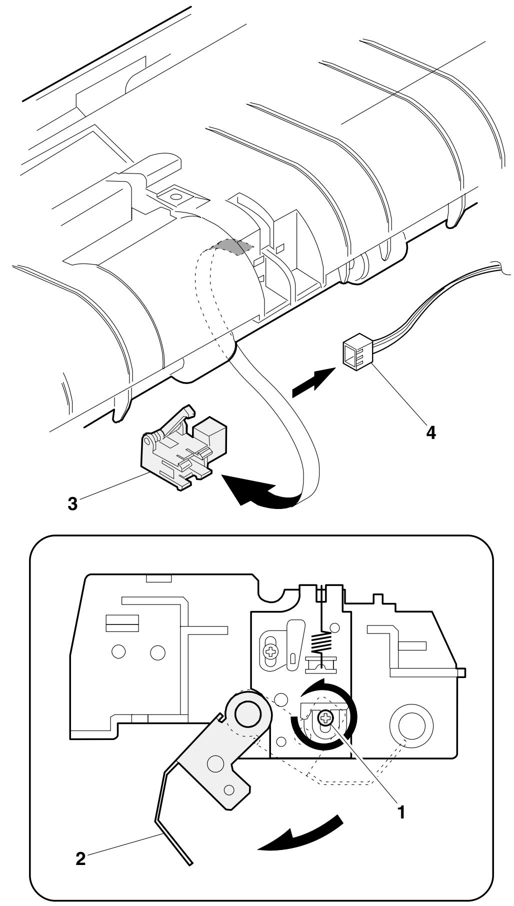
(2) Remove the paper supply roller.

1) Loosen the screw.
2) Open the paper exit paper guide.
3) Remove the parts.
4) Remove the paper supply roller.



Q. Paper entry sensor

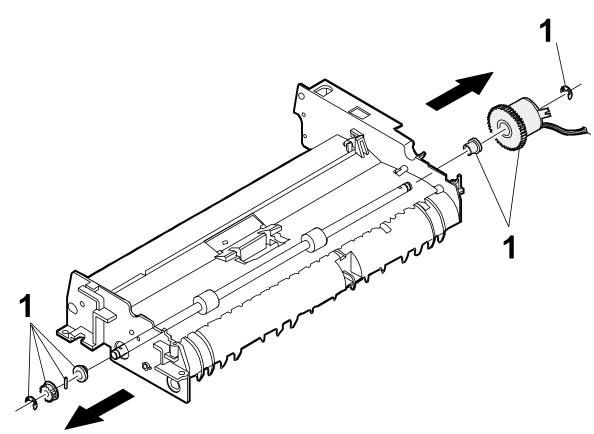
1) Loosen the screw.
2) Open the paper exit paper guide.
3) Remove the paper entry sensor.
4) Remove the harness.



R. Transport roller 1.

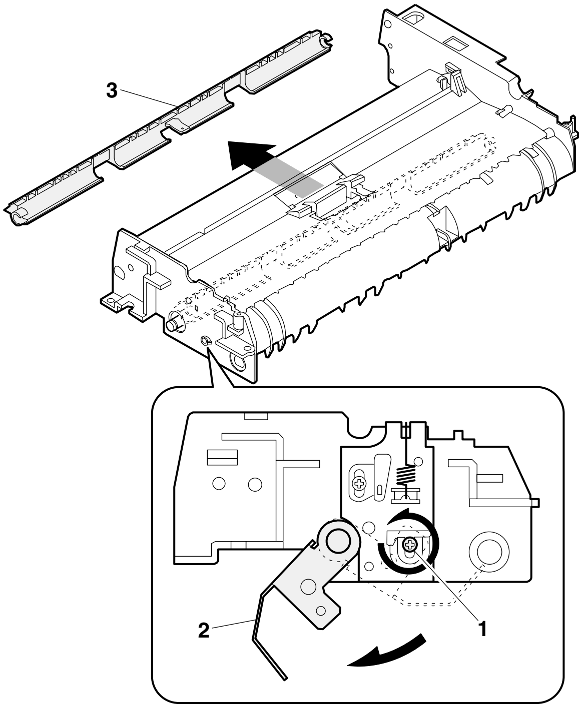
(1) Remove the parts.

1) Remove the parts.



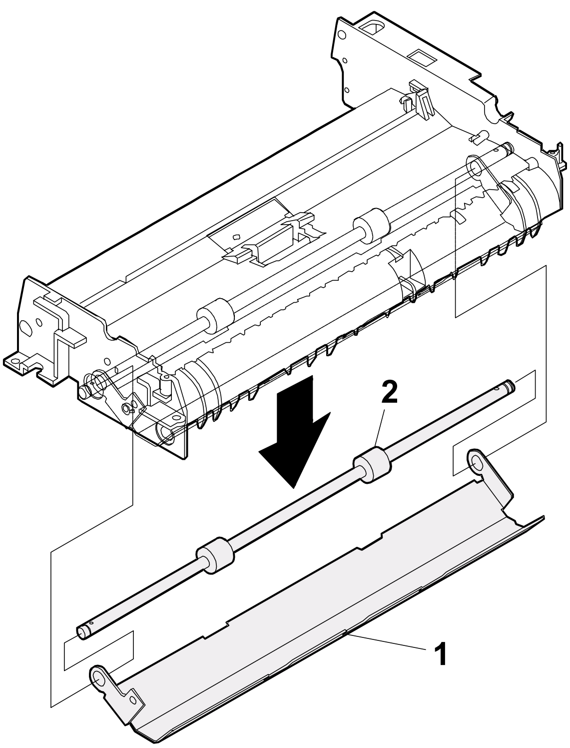
(2) Remove the parts.

1) Loosen the screw.
2) Open the paper exit paper guide.
3) Remove the parts.



(3) Remove the transport roller.

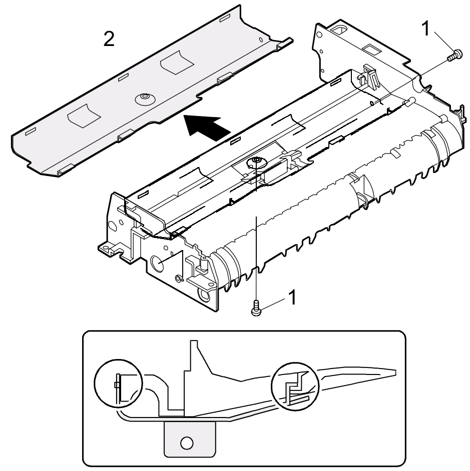
1) Remove the paper exit paper guide.
2) Remove the transport roller.



S. Paper exit roller

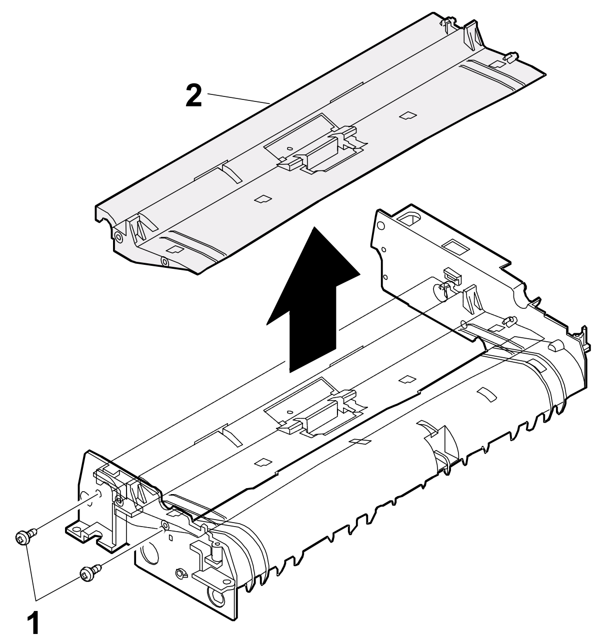
(1) Remove the parts.

1) Remove two screws.
2) Remove the parts.



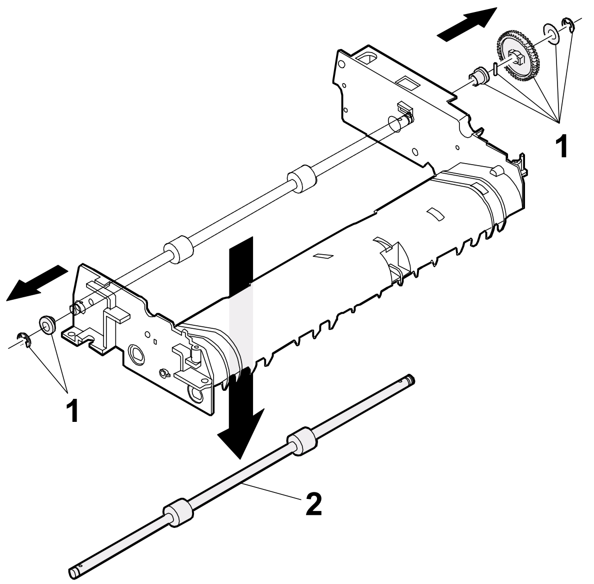
(2) Remove the paper feed paper guide upper.

1) Remove two screws.
2) Remove the paper feed paper guide upper.



(3) Remove the paper exit roller.

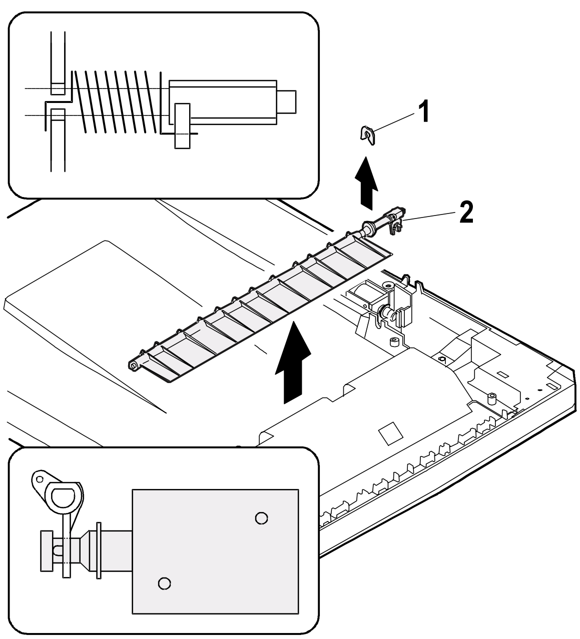
1) Remove the parts.
2) Remove the paper exit roller.



T. Solenoid

(1) Remove the reverse gate

1) Remove the ring
2) Remove the reverse gate

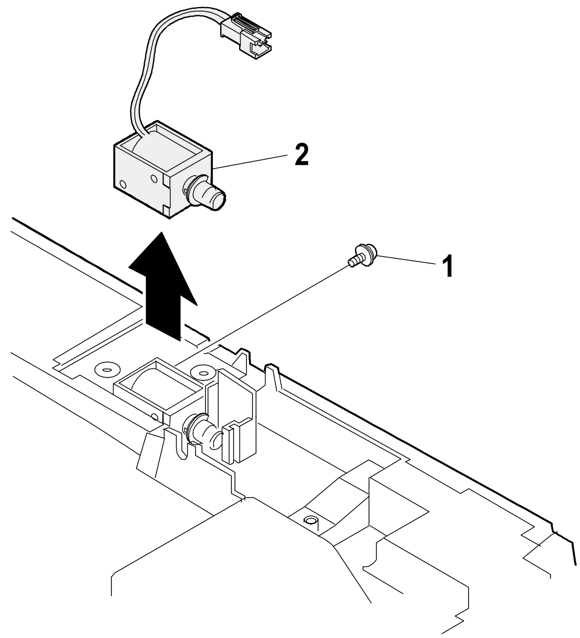


Note: When reassembling, be careful of the groove and the hole positions of the spring.

Note: When reassembling, hang 2) on the solenoid.

(2) Remove the solenoid.

1) Remove the screw.
2) Remove the solenoid.



[9] ADJUSTMENTS

1. Optical section

A. Copy magnification ratio adjustment

The copy magnification ratio must be adjusted in the main scanning direction and in the sub scanning direction. To adjust, use TC 48-01.

(1) Outline

The main scanning (front/rear) direction magnification ratio adjustment is made manually.

The adjustment is made by manual key operations. (The zoom data register set value is changed for adjustment.)

The magnification ratio in the sub scanning direction is adjusted by changing the carriage (scanner) scanning speed.

(2) Main scanning/sub scanning direction magnification ratio adjustment

a. Cases when the adjustment is required

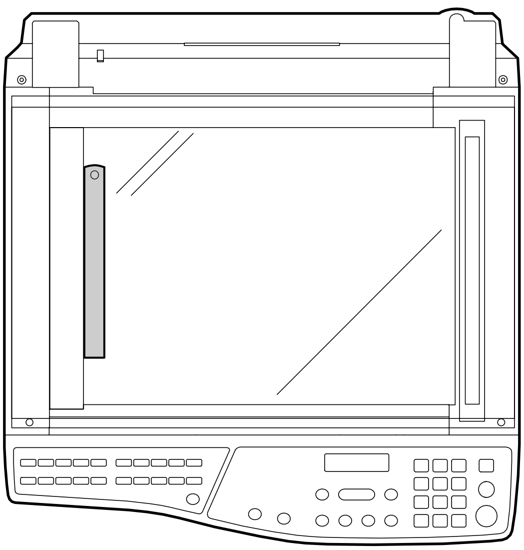
1) When the main PWB is replaced.
2) When the EEPROM in the main PWB is replaced.
3) When "U2" trouble occurs.
4) When repairing or replacing the optical section.

b. Necessary tools

- Scale

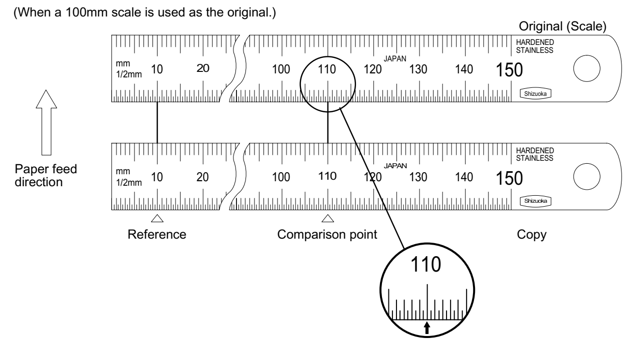
c. Main scanning direction adjustment procedure

1) Set the scale vertically on the document table. (Use a long scale for precise adjustment.)



2) Set the copy magnification ratio to 100%.
3) Make a copy on A4 or 81/2" x 11" paper.
4) Measure the length of the copied scale image.
5) Calculate the main scanning direction magnification ratio.
   Main scanning direction magnification ratio

$$= \frac{\text{Copy image dimensions}}{\text{Original dimension}} \times 100\ (\%)$$



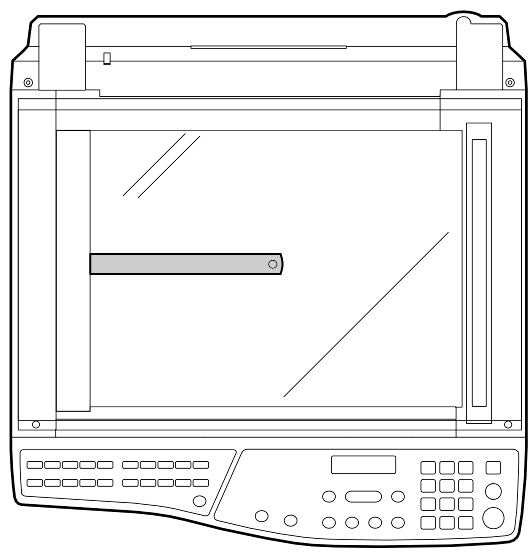
6) Check that the copy magnification ratio is within the specified range. If it is not within the specified range, perform the following procedures.
7) Execute TC 48-01 to select the main scanning direction copy magnification ratio adjustment mode.
   To select the adjustment mode, use the [←/→] key.

Mode	Display item	Default value	LED
Main scan direction magnification ratio	F-R	50	PRINT mode lamp
OC mode sub scan direction magnification ratio	SCAN	50	SCAN mode lamp

8) Enter the new set value of main scanning direction copy magnification ratio with the copy quantity set key, and press the [START] key.
9) Change the set value and repeat the adjustment until the ratio is within the specified range.
   When the set value is changed by 1, the magnification ratio is changed by 0.1%.

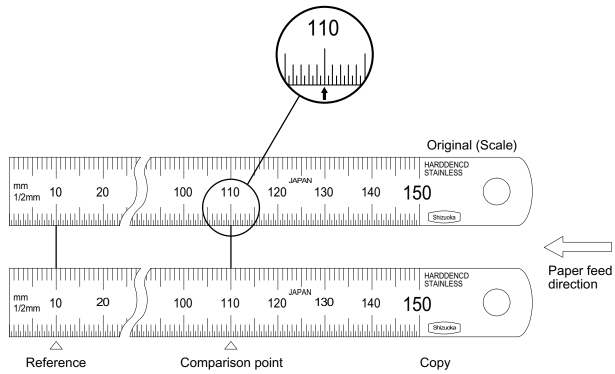
d. Sub scanning direction adjustment procedure

1) Set the scale on the document table as shown below. (Use a long scale for precise adjustment.)



2) Set the copy magnification ratio to 100%.
3) Make a copy on A4 or 81/2" x 11" paper.
4) Measure the length of the copied scale image.
5) Calculate the sub scanning direction copy magnification ratio using the formula below.

$$= \frac{\text{Copy image dimensions}}{\text{Original dimension}} \text{ X } 100 \text{ (\%)}$$



6) Check that the actual copy magnification ratio is within the specified range. (100 ± 1.0%).
If it is not within the specified range, perform the following procedures.
7) Execute TC 48-01 to select the sub scanning direction copy magnification ratio adjustment mode.
To select the adjustment mode, use the [←/→] key. (SCAN mode lamp ON)
8) Enter the new set value of sub scanning direction copy magnification ratio with the copy quantity set key, and press the [START] key.

Repeat procedures 1) - 8) until the sub scanning direction actual copy magnification ratio in 100% copying is within the specified range.

When the set value is changed by 1, the magnification ration is changed by 0.1%.

B. Image position adjustment

The employed test commands and the contents are as follows:

Mode	Display item	Default	LED	TC
Print start position (Main cassette paper feed)	TRAY1	50	COPY mode lamp Main cassette lamp	50-01
(*) Print start position (2nd cassette paper feed)	TRAY2	50	COPY mode lamp 2nd cassette lamp	
Print start position (Manual paper feed)	MFT	50	COPY mode lamp Manual feed lamp	
Image lead edge void amount	DEN-A	50	PRINT mode lamp	
Image scan start position	RRC-A	50	SCAN mode lamp	
Image rear edge void amount	DEN-B	50	COPY mode lamp PRINT mode lamp SCAN mode lamp	

Mode	Display item	Default	LED	TC
Print center offset (Main cassette paper feed)	TRAY1	50	COPY mode lamp Main cassette lamp	50-10
(*) Print center offset (2nd cassette paper feed)	TRAY2	50	COPY mode lamp 2nd cassette lamp	
Print center offset (Manual paper feed)	MFT	50	COPY mode lamp Manual feed lamp	
2nd print center offset (Main cassette paper feed)	SIDE2	50	PRINT mode lamp Main cassette lamp	

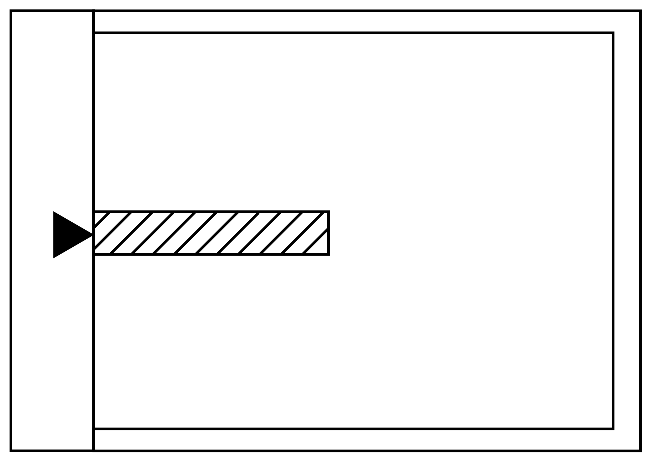
The modes can be selected by pressing [←/→] key.

(*): Support for the installation models. For non-installation models, skip.

* In the 2nd print center offset adjustment, print is made forcibly as 1to2/Long Edge from OC regardless of duplex setting.

(1) Lead edge adjustment

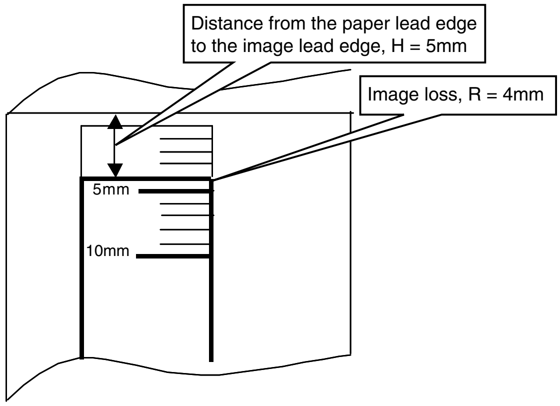
1) Set a scale to the center of the paper lead edge guide as shown below, and cover it with B4 or 8 1/2" x 14" paper or OC cover.

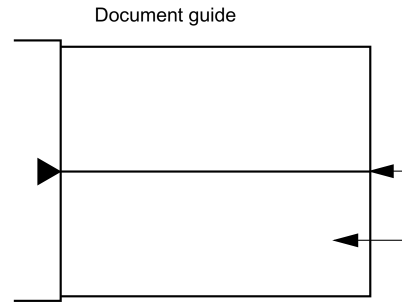


2) Execute TC 50 - 01
3) Set the print start position (A: COPY mode lamp ON), the lead edge void amount (B: PRINT mode lamp ON), the scan start position (C: SCAN mode lamp) to 1, and make a copy of the scale at 100%.
4) Measure the image loss (Rmm) of the scale.
Set C = 10 x R (mm). (Example: Set to 40.)
When the value of C is increased by 10, the image loss is decreased by 1mm. (Default: 50)
5) Measure the distance (Hmm) from the paper lead edge to the image print start position.
Set A = 10 x H (mm). (Example: Set to 50.)
When the value of A is increased by 10, the image lead edge is moved to the paper lead edge by 1mm. (Default: 50).
6) Set the lead edge void amount to B = 50 (2.5mm). (Default: 50)
When the value of B is increased by 10, the void is extended by about 0.1mm. (For 25 or less, however, the void amount is regarded as 0.)

* The SPF adjustment is made by adjusting the SPF image scan start position after OC adjustment.

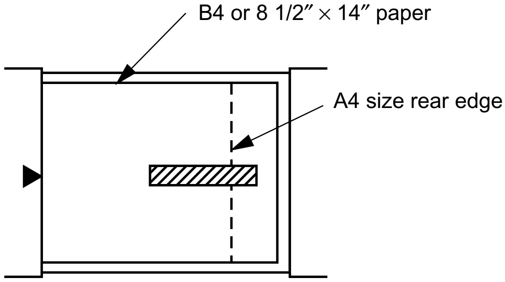
(Example)





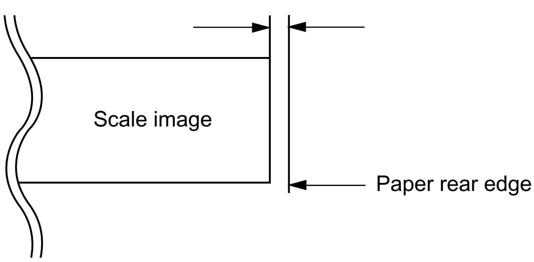
(2) Image rear edge void amount adjustment

1) Set a scale to the rear edge section of A4 or 11" x 8 1/2" paper size as shown in the figure below, and cover it with B4 or 8 1/2" x 14" paper.



2) Execute TC 50 - 01 to select the image rear edge void amount adjustment mode.
   The set adjustment value is displayed on the copy quantity display.
3) Make a copy and measure the void amount of image rear edge.

Void amount (Standard value: 2 - 3mm)



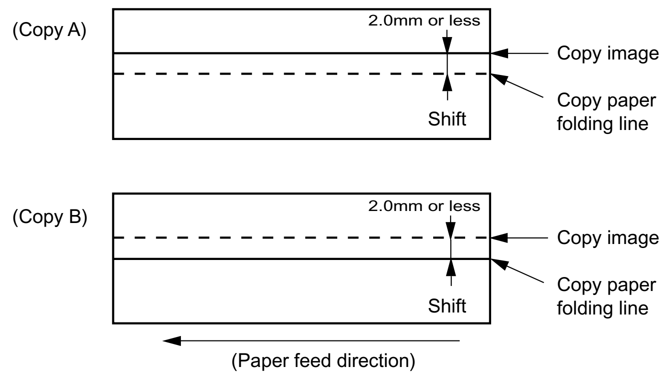
4) If the measurement value is out of the specified range, change the set value and repeat the adjustment procedure.
   The default value is 50.

(3) Center offset adjustment

1) Set the self-made test chart for the center position adjustment so that its center line is aligned with the center mark of the document guide.

- Test chart for the center position adjustment.
  Draw a line at the center of A4 or 8 1/2" x 11" paper in the paper transport direction.

2) Execute TC 50-10 to select the print center offset (cassette paper feed) adjustment mode.
   The set adjustment value is displayed on the copy quantity display.
3) Make a copy and check that the copied center line is properly positioned.
   The standard value is 0 ±2mm from the paper center.



4) If the measured value is out of the specified range, change the set value and repeat the adjustment procedure.
   When the set value is increased by 1, the copy image is shifted by 0.1mm toward the rear frame.

- For the manual paper feed, change the manual paper feed adjustment mode and perform the similar procedures.
- Since the document center offset is automatically adjusted by the CCD which scan the reference lines (F/R) on the back of document guide, there is no need to adjust manually.

2. Copy density adjustment

A. Copy density adjustment timing

The copy density adjustment must be performed in the following cases:

- When maintenance is performed.
- When the developing bias/grid bias voltage is adjusted.
- When the optical section is cleaned.
- When a part in the optical section is replaced.
- When the optical section is disassembled.
- When the OPC drum is replaced.
- When the main control PWB is replaced.
- When the EEPROM on the main control PWB is replaced.
- When the memory trouble (U2) occurs.

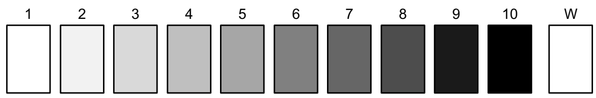
B. Note for copy density adjustment

1) Arrangement before execution of the copy density adjustment

- Clean the optical section.
- Clean or replace the charger wire.
- Check that the voltage at the high voltage section and the developing bias voltage are in the specified range.

C. Necessary tool for copy density adjustment

- One of the following test charts:
  UKOG-0162FCZZ, UKOG-0089CSZZ, KODAK GRAY SCALE
- B4 (14" x 8 1/2") white paper
- The user program AE setting should be "3."



Test chart comparison table

UKOG-0162FCZZ DENSITY No.	1	2	3	4	5	6	7	8	9	10	W
UKOG-0089CSZZ DENSITY No.	0.1		0.2		0.3				0.5	1.9	0
KODAK GRAY SCALE		1		2		3		4		19	A

D. Features of copy density adjustment

For the copy density adjustment, the image data shift function provided in the image process LSI is used.

List of the adjustment modes

Auto Mode	Brightness 1 step only
Manual Mode	Brightness 5 steps. Adjustment of only the center brightness is made.
Photo Mode	Brightness 5 steps. Adjustment of only the center brightness is made.
Manual T/S mode	Brightness 5 steps. Adjustment of only the center brightness is made.
T/S Auto mode	Brightness 1 step only

E. Copy density adjustment procedure

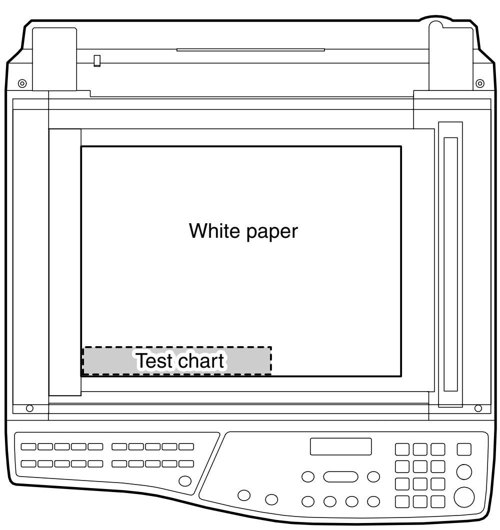
The copy density can be adjusted in 300dpi or in 600dpi.

Main code	Sub code	Resolution for copy density adjustment
46	01	300dpi
	02	600dpi

For selection of modes, use the copy mode select key.

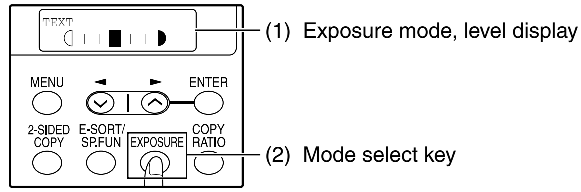
(1) Test chart (UKOG-0162FCZZ) setting

1) Place the test chart so that its edge is aligned with the A4 (Letter) reference line on the document table. Then place a A4 (14" x 8 1/2") white paper on the test chart and close the document cover.



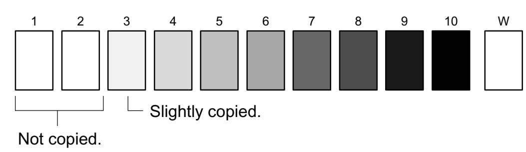
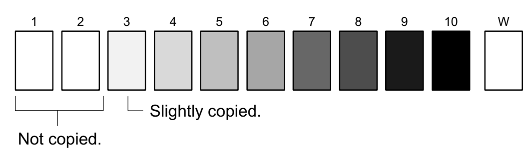
(2) Perform the adjustment in each mode.

1) Execute TC 46-01 (300dpi). To adjust in 600dpi, execute TC 46-02.
2) Select the mode to be adjusted with the exposure mode select key. Set the exposure level to 3 (center) for all adjustment. (Except for the auto mode.)



Adjustment mode	Display item	LED	Sharp gray chart adjustment level
Auto mode	AE	COPY mode lamp	"3" is slightly copied.
Text mode	TEXT	PRINT mode lamp	"3" is slightly copied.
Photo mode	PHOTO	SCAN mode lamp	"3" is slightly copied.
Text T/S mode	TSTXT	PRINT mode lamp SCAN mode lamp	"3" is slightly copied.
Auto T/S mode	TSAE	COPY mode lamp SCAN mode lamp	"3" is slightly copied.

3) Make a copy.
   Check the adjustment level (shown in the above table) of the exposure test chart (Sharp Gray Scale).

	Sharp Gray Scale adjustment level
Non toner save mode	
Toner save mode	

(When too bright): Decrease the value displayed on the copy quantity display.

(When too dark): Increase the value displayed on the copy quantity display.

* The value can be set in the range of 1 - 99.

3. High voltage adjustment

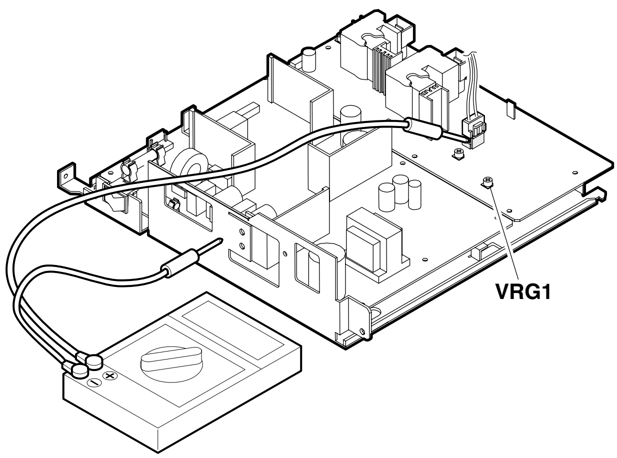
A. Main charger (Grid bias)

Note:

- Use a digital multi meter with internal resistance of 10MΩ or more measurement.
- After adjusting the grid LOW output, adjust the HIGH output. Do not reverse the sequence.

Procedures

1) Set the digital multi meter range to DC700V.
2) Set the positive side of the test rod to the connector CN11-3 (GRID) of high voltage section of the power PWB and set the negative side to the frame ground (power frame).
3) Execute TC 8-02. (The main charger output is supplied for 30 sec in the grid voltage HIGH output mode.)
4) Adjust the control volume (VRG1) so that the output voltage is 580 ±12V.

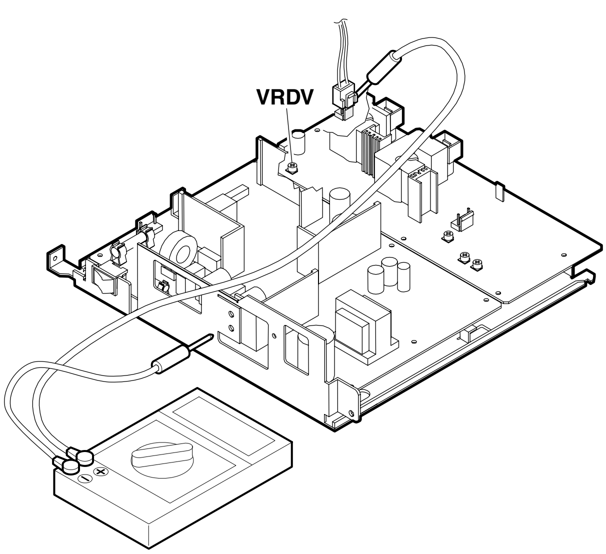


B. DV bias check

Note:
- A digital multi meter with internal resistance of 1GΩ must be use for correct check.
- The adjustment volume is locked, and no adjustment can be made.

Procedures

1) Set the digital multi meter range to DC500V.
2) Set the positive side of the test rod to the connector CN-10-1 (DV BIAS) and set the negative side to the frame ground (power frame).
3) Execute TC 25-01 to output the developing bias for 30sec, and check that the output is –400±8V.



4. Duplex adjustment

A. Adjusting the paper reverse position in memory for duplex copying

This step adjusts the front surface printing (odd-number pages of a document set) in the S-D mode copying and the leading edge position of an image on even-number pages in the D-S mode.

That is, it covers the adjustment of the second surface printing mode (image loss at the front edge of an image) in which image data is once stored in memory.

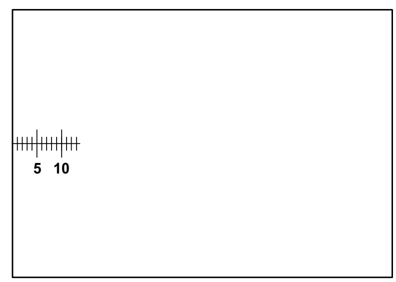
The image data is read, starting from its front end in the document delivery direction (Reference direction of document setting in the OC mode)and stored in memory.

This stored image data is printed starting at the printing start position, in the order of last-stored data to the first-stored data.

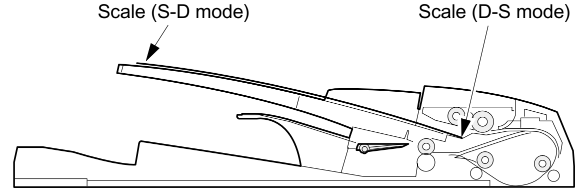
In other words, the front edge image loss of the image can be adjusted by changing the document read end position.

(Adjustment procedure)

1) Preparing test chart (Draw a scale at the rear end of one side of a sheet of A4 white paper or letter paper)



2) Set the test chart so that the scale is positioned as shown below, in the S-D mode and the D-S mode.



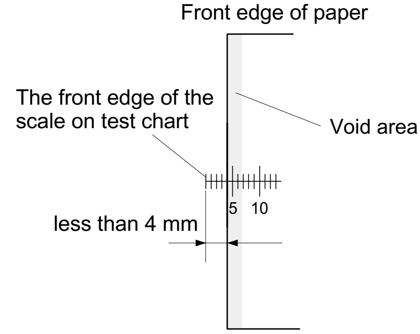
3) Execute test command 50-18.

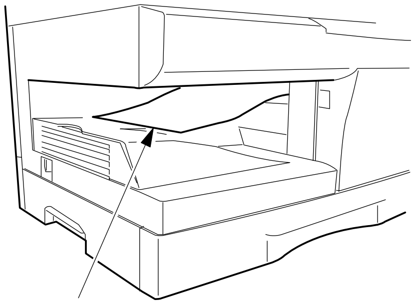
Mode	Display item	Default	LED
OC memory reverse output position	OC	50	COPY mode lamp
SPF memory reverse output position	SPF	50	PRINT mode lamp

Select the SPF memory reverse output position, and press [START] key to make a copy.

Adjust the setting so that the front edge image loss is less than 4.0 mm in the R-SPF mode.

An increase of 1 in setting represents an increase of 0.1 mm in image loss.





B. Adjusting trailing edge void in duplex copy mode

This is the adjustment of the first surface printing mode (rear end void) in duplex copying.

In a duplex copying operation, the paper is delivered starting from the rear end of the first printing surface. It is therefore necessary to make a void area at the rear end on the first printing surface to prevent paper jam at the fusing part.

There are two adjustment modes:

1) Image cut rear end void quantity (R-SPF) 50-19 (SCAN mode lamp)
   The size (length) of a document read from the R-SPF is detected, the image at the trailing edge of the first printing surface is cut to make a void area. (The adjustment of void quantity at the time when the cassette paper size is not recognized.)
2) Paper trailing edge void quantity 50-19 (PRINT mode lamp)
   This adjustment is made when the cassette paper size is recognized. The trailing edge void quantity can be adjusted by changing the trailing edge image laser OFF timing.

The paper void quantity should be first adjusted before the image cut trailing edge void quantity (R-SPF) is adjusted.

The adjustment modes can be selected by pressing [←/→] key. (Adjustment range; 1 – 99)

Enter the adjustment value and press [START] key to save the set value and make a copy. (The paper information is cleared for every copy.)

When the set value is increased by 1, the void amount is increased by about 0.1mm.

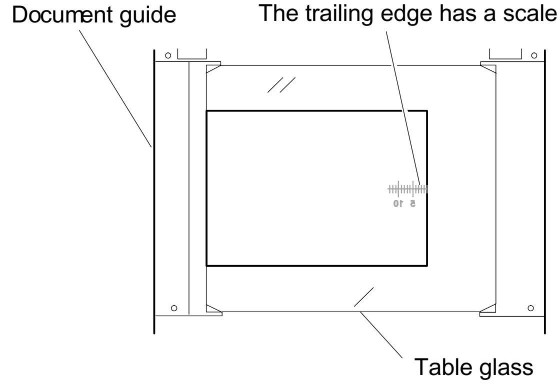
Mode	Display item	Default	LED
Paper rear edge void amount	DEN-B	50	PRINT mode lamp
Print start position (Duplex back surface)	RRC-D	50	SCAN mode lamp

* The initial value of duplex setting is 2to2.

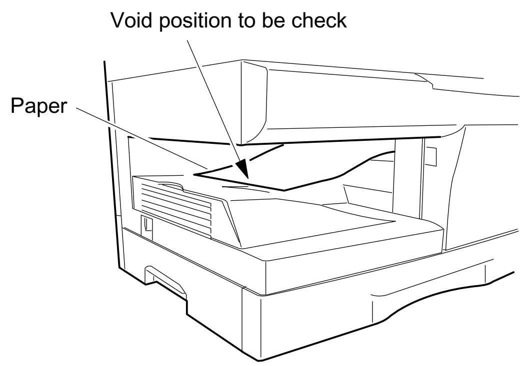
(Adjustment procedure)

(1) Paper trailing edge void quantity

1) Preparing test chart (Draw a scale at the rear end of one side of a sheet of A/4 white paper or letter paper)
2) Set the test chart on the document glass as shown below.



3) Execute test command 50-19 to turn on the PRINT mode lamp and make the printing mode in OC-D mode.
   Make a copy of the test chart to check the void area of the scale on the image.

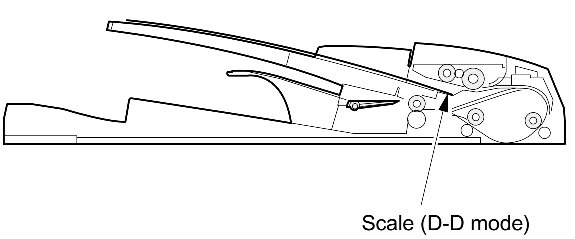


The trailing edge void on the first printing surface is shown above.

Adjust the setting so that the void area is 4 - 5 mm. An increase in 1 of setting represents 0.1 mm in void area.

(2) Image cut trailing edge void quantity (R-SPF)

1) Set the test chart so that the scale is positioned as shown below.



2) Execute test command 50-19 to turn on the SCAN mode lamp(on the operation panel) and make the printing mode in the D-D mode.
3) Remove and reinsert the cassette.

Note: Make sure to carry out this step before making a copy during this adjustment.

4) Make a copy and check the void area of the scale on the image.
   Adjust the setting so that the void area is 2 - 4 mm. An increase of 1 in setting represents an increase of 0.1 mm in void area.
   l Void position to be checked

5. RSPF scan position automatic adjustment

Place a black chart so that it covers the SPF scan glass and the OC glass together, and close the OC cover.

When test command 53-08 is executed, the current adjustment value is displayed as the initial display.

* Default is 1. Adjustment range is 1 – 99. Adjustment unit 1 = about 0.127mm
* If the values are kept as the default values, SPF scan is not performed properly. The front area of the proper scan position may be scanned.

In case of AUTO, press [START] key, and the mirror unit scans from the home position to the SPF scan position with the adjustment value displayed. The SPF glass cover edge position is calculated from the difference between the SPFG glass cover edge and the OC side document glass CCD output level. If the adjustment is normal, the adjusted value is displayed. If abnormal, the error LED lights up with the current set value displayed.

During the error LED is lighted, when [START] key is pressed again, execution is performed again.

Mode	Display item	Default	LED
SPF scan position auto adjustment	AUTO	1	COPY mode lamp
SPF scan position manual adjustment	MANU	1	PRINT mode lamp

Operation

The operation is similar to test command 46-01. (In MANUAL)

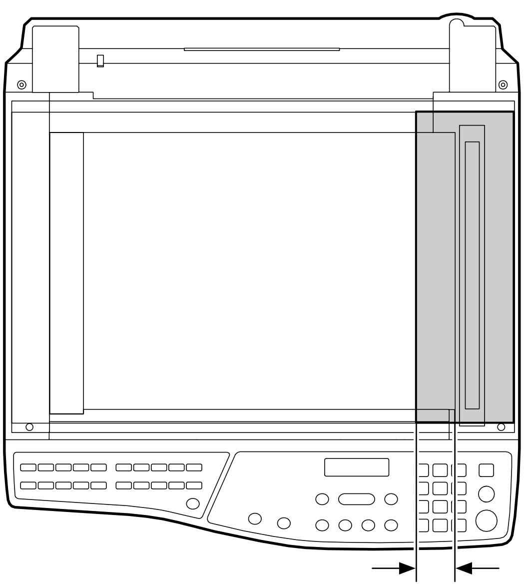
OK/ERR display in AUTO

<When OK>

```
53-08 SPF AUTO
AUTO  100% **    OK
```

<When ERR>

```
53-08 SPF AUTO
AUTO  100% **    ERR
```

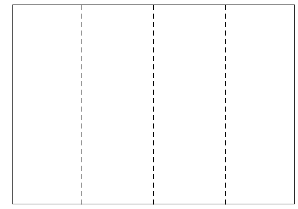


6cm or more is required.

* Use a black chart (UKOG-0011QSZZ) or prepare a chart as shown below.
  Chart size: 300 x 100, prepared with cutting sheet No. 791 (Black) or an equivalent one.

  Reason: To prevent erroneous detection by disturbing light of a fluorescent lamp, etc.

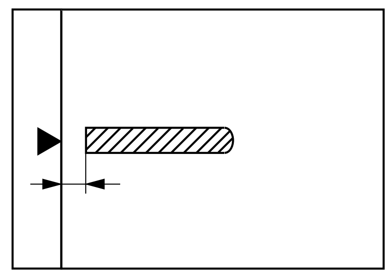
  The size of the black chart (UKOG-0011QSZZ) is 297 x 420. Divide it into four for use.



6. RSPF mode sub scanning direction magnification ratio adjustment

Note: Before performing this adjustment, be sure to check that the OC mode adjustment in copying has been completed.

1) Put a scale on the original table as shown below, and make a normal copy (100%) on the front and the back surfaces to make a test chart.



Note: Since the printed copy is used as a test chart, put the scale in paralleled with the edge lines.

2) Set the test chart on the RSPF and make a duplex copy (D-D or D-S) in the normal ratio (100%).
3) Compare the scale image and the actual image.
   If necessary, perform the following adjustment procedures.
4) Execute TC 48-05.
5) The current front surface sub scanning direction magnification ratio correction value is displayed in two digits on the display section.
   To select SIDE1 and SIDE2, use [←/→] keys.
6) Enter the set value and press the start key.
   When adjusting the RSPF, use [2-SIDED COPY] key to select single/duplex after entering the one page print mode, performing 2-page single copy.

Mode	Display item	Default	LED
Sub scan magnification ratio adjustment on the surface of SPF/ RSPF document	SIDE1	50	COPY mode lamp
Sub scan magnification ratio adjustment on the surface of RSPF document	SIDE2	50	PRINT mode lamp

* When there is no document in RSPF, copy is inhibited.

<Adjustment specification>

Adjustment mode	Spec value	TC	Set value	Setting range
Sub scanning direction magnification ratio (RSPF mode)	At normal: ±1.0%	48-5	Add 1: 0.1% increase Reduce 1: 0.1% decrease	1 – 99

7. Automatic black level correction

a. Cases when the adjustment is required

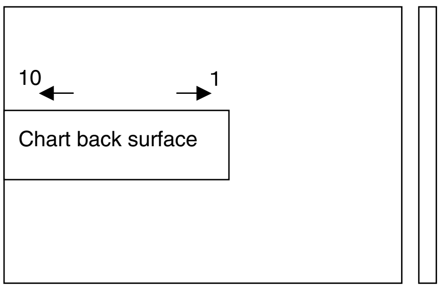
1) When the main PWB is replaced.
2) When the EEPROM in the main PWB is replaced.
3) When "U2" trouble occurs.
4) When repairing or replacing the optical section.

b. Adjustment procedure

Used to acquire the black level target value used for the black level adjustment of white balance.

When test command 63-02 is executed, the current correction value is displayed in 3 digits of 12bit hexadecimal number.

Place the gray gradation chart (UKOG-0162FCZZ) used as the correction document so that the density 10 (black side) comes on the left side and that the chart is upside down at the center of the plate left center.



When [ENTER/START] key is pressed, the mirror base unit scans the chart and calculates the correction value.

After completion of correction, the corrected value is displayed on the LCD.

* Default: 0

* If the value is set to the default, operation is made with 0x60.

c. Operation

1) Initial display

```
63-02 BLACK LEVEL
                0
```

2) [ENTER/START] Correction start

```
63-02 BLACK LEVEL
EXECUTING...
```

<During canceling - When C/CA is pressed->

After canceling, the machine goes into the sub code entry standby mode.

```
THE JOB IS BEING
CANCELED.
```

3) After execution

```
63-02 BLACK LEVEL
             *** OK
```

3) In case of an error

```
63-02 BLACK LEVEL
             *** ERR
```

[10] TEST COMMAND, TROUBLE CODES

1. Entering the test command mode

To enter the serviceman test command mode, press the keys as follows:

[#] key → [*] key → [C] key → [*] key

To cancel the test command mode, press the [CA] key.

2. Key rule

[10KEY]:	Entry of MAIN CODE/SUB CODE Selection of an item Setup of an adjustment value in case of test commands for adjustment
[←/→]:	Selection of MAIN CODE/SUB CODE Selection of an item
[ENTER/START]:	Settlement <In case of test commands for print> [ENTER]: Settlement (Without print) [START]: Settlement/Print
[C]:	(Interrupting operation check) Returns to the upper hierarchy. In case of test command of operation check, terminates the operations.
[CA]:	Exits from the test command mode. For a test command of adjustment, the display returns to the initial display (00-00).

3. List of test commands

Main code	Sub code	Contents
1	01	Mirror scan (SCAN CHK)
	02	Mirror home position sensor (MHPS) status display (MHP-SENSOR)
	06	Mirror scan aging (SCAN AGING)
2	01	Single Paper Feeder (SPF) aging (SPF AGING) (Disabled when set to OC)
	02	SPF sensor status display (SPF SENSOR) (Disabled when set to OC)
	03	SPF motor operation check (SPF MOTOR CHK) (Disabled when set to OC)
	06	RSPF resist clutch operation check (RSPF RES.CHK) (Enabled only when RSPF is set.)
	08	SPF paper feed solenoid operation check (SPF SPUS CHK) (Disabled when set to OC)
	09	RSPF reverse solenoid operation check (RSPF SPFS CHK) (Enabled only when RSPF is set.)
	10	RSPF paper exit gate solenoid operation check (RSPF SGS CHK) (Enabled only when RSPF is set.)
3	03	Shifter operation check (SHIFTER CHK)
5	01	Operation panel display check (LCD/LED CHK)
	02	Fusing lamp, cooling fan operation check (HT LAMP CHK)
	03	Copy lamp ON check (C-LAMP CHK)
6	01	Paper feed solenoid (CPFS1, CPFS2, MPFS) operation check (PSOL CHK)
	02	Resist roller solenoid (RRS) operation check (RES.R SOL CHK)
7	01	Check of warm-up display and aging with JAM (W-UP/ AGING)
	06	Interval aging (INTERVAL AGING)
	08	Shift to copy with warm-up display (W-UP C-MODE)
8	01	Developing bias output (DVLP BIAS SET.)
	02	Main charger output (Grid HIGH) (MHV(H) SET.)
	03	Main charger output (Grid LOW) (MHV(L) SET.)
	06	Transfer charger output (THV SET.)
9	01	Duplex motor normal rotation check (DPLX ROT.) (Enabled when Duplex setting is ON)
	02	Duplex motor reverse rotation check (DPLX ROT.REV.) (Enabled when Duplex setting is ON)
	04	Duplex motor rotating speed adjustment (DPLX ROT.SPEED) (Enabled when Duplex setting is ON)
10	00	Toner motor operation (TONER MOTOR)
14	00	Cancel of trouble other than U2 (TRBL CANC.)
16	00	U2 trouble cancel (U2 TRBL CANC.)
20	01	Maintenance counter clear (M-CNT CLR.)
21	01	Maintenance cycle setting (M-CYCLE)
22	01	Maintenance counter display (M-CNT)
	02	Maintenance preset display (M-CNT PRESET)
	04	JAM total counter display (JAM TTL CNT)
	05	Total counter display (TTL CNT)
	06	Developer counter display (DVLP CNT)
	08	SPF counter display (SPF CNT) (Disabled when set to OC)
	11	FAX-related counter display (Executable only when the FAX is installed.)
	12	Drum counter display (DRUM CNT)
	13	CRUM type display (CRUM TYPE)
	14	ROM version display (ROM VER.)
	16	Duplex counter display (DPLX CNT) (Enabled when Duplex setting is ON)
	17	Copy counter display (COPIES CNT)
	18	Printer counter display (PRT.CNT)
	19	Scanner mode counter display (S-MODE CNT)
	21	Scanner counter display (SCAN CNT)
	22	SPF JAM counter display (S JAM CNT) (Disabled when set to OC)

Main code	Sub code	Contents
24	01	JAM total counter clear (JAM TTL CLR.)
	04	SPF counter clear (SPF CLR.) (Disabled when set to OC)
	05	Duplex counter clear (DPLX CLR.) (Enabled when Duplex setting is ON)
	06	Developer counter clear (DVLP CLR.)
	07	Drum counter clear (DRUM CLR.)
	08	Copy counter clear (COPIES CLR.)
	09	Printer counter clear (PRT.CLR.)
	10	FAX counter clear (FAX CLR.) (Executable only when the FAX is installed.)
	13	Scanner counter clear (SCAN CLR.)
	14	SPF JAM total counter clear (S JAM TTL CLR.) (Disabled when set to OC)
	15	Scanner mode counter clear (S-MODE CLR.)
25	01	Main motor operation check (MAIN MOTOR CHK)
	10	Polygon motor operation check (LSU CHK)
26	02	RSPF setting (RSPF)
	03	Second cassette setting (2ND TRAY)
	04	Main unit duplex setting (DPLX)
	06	Destination setting (DESTINATION)
	07	Machine conditions check (CPM)
	20	Rear edge void setting (END EDGE)
	30	CE mark support control ON/OFF (CE MARK)
	37	Cancel of stop at developer life over (DVLP LIFE END)
	39	Memory capacity check (MEM.CHK)
	40	Polygon motor OFF time setting (Time required from completion of printing to turning OFF the motor) (LSU MOTOR OFF)
	42	Transfer ON timing control setting (TC ON TIMING)
	43	Side void amount setting (SIDE VOID)
	62	Energy-save mode copy lamp setting (C-LAMP E-S)
30	01	Paper sensor status display (P-SENSOR)
41	06	OC cover float detection level (OC FLOAT LEVEL) (Disabled when set to OC)
43	01	Fusing temperature setting (Normal copy) (FU TEMP)
	04	Fusing temperature setting in multi coy (FU TEMP MULTI)
	05	Fusing temperature setting in duplex copy (FU TEMP DPLX) (Enabled when Duplex setting is ON)
	14	Fusing start temperature setting (FU TEMP START)
46	01	Copy density adjustment (300dpi) (EXP.LEVEL 300)
	02	Copy density adjustment (600dpi) (EXP.LEVEL 600)
	12	Density adjustment in the FAX mode (Collective adjustment) (Executable only when the FAX is installed.)
	13	FAX mode density adjustment (normal text) (Executable only when the FAX is installed.)
	14	FAX mode density adjustment (Fine text) (Executable only when the FAX is installed.)
	15	FAX mode density adjustment (Super fine) (Executable only when the FAX is installed.)
	18	Image contrast adjustment (300dpi) (GAMMA 300)
	19	Exposure mode setting (AE MODE)
	20	SPF exposure correction (EXP.LEVEL SPF) (Disabled when set to OC)
	29	Image contrast adjustment (600dpi) (GAMMA 600)
	30	AE limit adjustment (AE LIMIT)
	31	Image sharpness adjustment (SHARPNESS)
	32	Copier color reproduction setting (COLOR REAPPEAR)
	39	FAX mode sharpness adjustment (Executable only when the FAX is installed.)

Main code	Sub code	Contents
48	01	Mains can/sub scan direction magnification ratio (COPY MAG.)
	05	RSPF mode sub scan direction magnification ratio in copying (RSPF MAG.) (Disabled when set to OC)
49	01	Download mode (DOWNLOAD MODE)
50	01	Lead edge image position (LEAD EDGE)
	06	Copy lead edge position adjustment (RSPF) (RSPF EDGE) (Disabled when set to OC)
	10	Print center offset adjustment (PRT.OFF-CENTER)
	12	Document feed off-center adjustment (ORG.OFF-CENTER)
	18	Memory reverse position adjustment in duplex copy (DPLX REVERSE) (Enabled when Duplex setting is ON with OC or SPF set)
	19	Duplex copy rear edge void adjustment (DPLX END EDGE) (Enabled when Duplex setting is ON)
51	02	Resist amount adjustment (RESIST ADJ.)
53	08	SPF scan position automatic adjustment (SPF AUTO) (Disabled when set to OC)
61	03	HSYNC output check (LSU CHK)
63	01	Shading check (SHADING CHK)
	02	Black level automatic correction (BLACK LEVEL)
64	01	Self print (1by2 mode) (SELF PRT.)
66	01	FAX soft SW setting (Executable only when the FAX is installed.)
	02	FAX soft SW initializing (excluding the adjustment values) (Executable only when the FAX is installed.)
	03	FAX PWB memory check (Executable only when the FAX is installed.)
	04	Signal send mode (Max. value) (Executable only when the FAX is installed.)
	05	Signal send mode (Soft SW set value) (Executable only when the FAX is installed.)
	07	Image memory content print (Executable only when the FAX is installed.)
	10	Image memory content clear (Executable only when the FAX is installed.)
	11	300bps signal send (Max. value) (Executable only when the FAX is installed.)
	12	300bps signal send (Soft SW set value) (Executable only when the FAX is installed.)
	13	Dial test (Executable only when the FAX is installed.)
	17	DTMF signal send (Max. value) (Executable only when the FAX is installed.)
	18	DTMF signal send (Soft SW set value) (Executable only when the FAX is installed.)
	21	FAX information print (Executable only when the FAX is installed.)
	24	FAST SRAM clear (Executable only when the FAX is installed.)
	30	TEL/LIU status change check (Executable only when the FAX is installed.)
	32	Receive data check (Executable only when the FAX is installed.)
	33	Signal detection check (Executable only when the FAX is installed.)
	34	Communication time measurement (Executable only when the FAX is installed.)
	37	Speaker sound volume setting (Executable only when the FAX is installed.)
	38	Time setting/check (Executable only when the FAX is installed.)
	41	CI signal check (Executable only when the FAX is installed.)

4. Descriptions of various test commands

<table>
<tr><th>Main code</th><th>Sub code</th><th>Contents</th><th>Details of function/operation</th></tr>
<tr><td>1</td><td>01</td><td>Mirror scan (SCAN CHK)</td><td>[Function]
When [ENTER/START] key is pressed, the home position is checked and the mirror base performs full scan at the speed of the set magnification ratio.
During operation, the set magnification ratio is displayed.
The mirror home position sensor status is displayed with the “COPY mode lamp”. (When the mirror is in the home position, the lamp lights up.)
During operation, the copy lamp lights up.
When [C] key is pressed, if the operation is on the way, it is terminated and the machine goes to the sub code entry standby mode.
[Operation]
1) Initial display
01-01 SCAN CHK
- 100% +
2) [←]
01-01 SCAN CHK
- 99% +
3) [ENTER/START]
01-01 SCAN CHK
EXECUTING... - 78% +
2) [ZOOM]
01-01 SCAN CHK
- 78% +
2) [→]
01-01 SCAN CHK
- 101% +</td></tr>
<tr><td></td><td>02</td><td>Mirror home position sensor (MHPS) status display (MHP-SENSOR)</td><td>[Function]
Monitors the mirror home position sensor, and makes the "COPY mode lamp" turn on during the sensor ON status.
[Operation]
1) Initial display
01-02 MHP-SENSOR
EXECUTING...</td></tr>
<tr><td></td><td>06</td><td>Mirror scan aging (SCAN AGING)</td><td>[Function]
When [ENTER/START] key is pressed, the mirror base performs full scan at the speed of the set magnification ratio.
During operation, the set magnification ratio is displayed.
After 3sec, the mirror base performs full scan again.
* When [ENTER/START] key is pressed once, the ready lamp remains OFF.
The mirror home position sensor status is displayed on the "COPY mode lamp." (The lamp is ON when the mirror is in the home position.)
During aging, the copy lamp is ON.
[Operation]
The operation is similar to test command 1-01.</td></tr>
<tr><td>2</td><td>01</td><td>Single Paper Feeder (SPF) aging (SPF AGING) (Disabled when set to OC)</td><td>[Function]
When [ENTER/START] key is pressed, the set magnification ratio is acquired and single-face document transport is performed in the case of SPF or duplex document transport in the case of R-SPF.
However, the operating conditions don't matter and the operation is not stopped even in case of a jam. Also the magnification ratio is displayed on the LCD.
[Operation]
The operation is similar to test command 1-01.</td></tr>
<tr><td></td><td>02</td><td>SPF sensor status display (SPF SENSOR) (Disabled when set to OC)</td><td>[Function]
The ON/OFF status of the SPF sensors can be checked with the LCD.
When a sensor is ON, the sensor name is displayed on the LCD.
<table><tr><th>Sensor</th><th>Display item</th></tr><tr><td>Document set sensor</td><td>SPID</td></tr><tr><td>SPF document transport sensor</td><td>SPPD</td></tr><tr><td>SPF paper feed cover open/close sensor</td><td>SDSW</td></tr></table>[Operation]
1) Initial display
02-02 SPF SENSOR
2) When the sensor is ON:
02-02 SPF SENSOR
SPID SPPD SDSW</td></tr>
<tr><td></td><td>03</td><td>SPF motor operation check (SPF MOTOR CHK) (Disabled when set to OC)</td><td>[Function]
When [ENTER/START] key is pressed, the motor rotates for 10sec at the speed corresponding to the set magnification ratio.
[Operation]
The operation is similar to test command 1-01.</td></tr>
</table>

Main code	Sub code	Contents	Details of function/operation

2	06	RSPF resist clutch operation check (RSPF RES.CHK) (Enabled only when RSPF is set.)	**[Function]**
			When [ENTER/START] key is pressed, the RSPF resist clutch (SRRC) repeats ON for 500ms and OFF for 500ms 20 times.
			[Operation]
			1) Initial display
			`02-06 RSPF RES.CHK`
			`EXECUTING...`

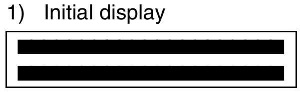
	08	SPF paper feed solenoid operation check (SPF SPUS CHK) (Disabled when set to OC)	**[Function]**
			The SPF paper feed solenoid (SPUS) repeats ON for 500ms and OFF for 500ms 20 times by the use of the solenoid drive control Bios.
			[Operation]
			1) Initial display
			`02-08 SPF SPUS CHK`
			`EXECUTING...`

	09	RSPF reverse solenoid operation check (RSPF SPFS CHK) (Enabled only when RSPF is set.)	**[Function]**
			The SPF reverse solenoid (SPFS) repeats ON for 500ms and OFF for 500ms 20 times by the use of the solenoid drive control Bios.
			[Operation]
			1) Initial display
			`02-09 RSPF SPFS CHK`
			`EXECUTING...`

	10	RSPF paper exit gate solenoid operation check (RSPF SGS CHK) (Enabled only when RSPF is set.)	**[Function]**
			The SPF paper exit gate solenoid (SGS) repeats ON for 500ms and OFF for 500ms 20 times by the use of the solenoid drive control Bios.
			[Operation]
			1) Initial display
			`02-10 RSPF SGS CHK`
			`EXECUTING...`

3	03	Shifter operation check (SHIFTER CHK)	**[Function]**
			The shifter is moved back and forth in four reciprocations.
			[Operation]
			1) Initial display
			`03-03 SHIFTER CHK`
			`EXECUTING...`

Main code	Sub code	Contents	Details of function/operation

5	01	Operation panel display check (LCD/LED CHK)	**[Function]**
			<LED check mode (All ON/Individual ON)>
			When [ENTER/START] key is pressed, all the LCD's on the operation panel are turned ON (all pixels ON).
			After 5sec of ON, the machine goes into the sub code entry standby mode.
			When [MODE SWITCH] key is pressed under the all ON state, the mode is shifted to the individual ON mode, where the LED's are turned on one by one from the left upper end to the left lower side then from the right upper side to the right lower side. (All the pixels of LCD are lighted simultaneously.) After lighting all the LCD's sequentially, all the LCD's are lighted simultaneously. After 5sec from lighting all the LCD's simultaneously, the machine goes into the sub code entry standby mode. (Cycle of individual ON mode: ON 300ms, OFF 20ms)
			When [C] key is pressed in the LED check mode, the machine goes into the sub code entry standby mode.
			When [START] key is pressed, the machine goes into the key input check mode.
			
			<Key input check mode>
			When the machine goes into the key input check mode, the LCD displays 0.
			When any key is pressed after pressing a key on the operation panel, "+1" is added to the value.
			Once a key is pressed, it is not recounted.
			When [START] key is pressed, counting is made and the machine goes into the LED ON check mode (LED all ON status) after 3sec.
			When [C] key is pressed for the first time, it is counted. When it is pressed for the second time, the machine goes into the sub code entry mode.
			When [CA] key is pressed for the first time, it is counted. When it is pressed for the second time, the machine goes out from the test command mode.
			
			(Note in the key input check mode)
			• Be sure to press [START] key at the last. (If it is pressed on the way, the machine goes into the LED ON check mode.) (LED all ON status)
			• Multi key input is ignored.
			[Operation]
			<LED check mode (All ON/Individual ON)>
			1) Initial display
			
			2) When [MODE SWITCH] key is pressed, the machine goes into the individual ON mode.
			
			<Key input check mode>
			1) Initial display
			`05-01 LCD/LED CHK.`
			`0`
			2) [ENTER/START]
			`05-01 LCD/LED CHK.`
			`**`

	02	Fusing lamp, cooling fan operation check (HT LAMP CHK)	**[Function]**
			When [ENTER/START] key is pressed, the fusing lamp repeats ON for 500ms and OFF for 500ms 5 times. During this period, the cooling fan motor rotates.
			[Operation]
			1) Initial display
			`05-02 HT LAMP CHK`
			`EXECUTING...`

	03	Copy lamp ON check (C-LAMP CHK)	**[Function]**
			When [ENTER/START] key is pressed, the copy lamp turns ON for 5sec.
			[Operation]
			1) Initial display
			`05-03 C-LAMP CHK`
			`EXECUTING...`

<table>
<tr><th>Main code</th><th>Sub code</th><th>Contents</th><th>Details of function/operation</th></tr>
<tr><td>6</td><td>01</td><td>Paper feed solenoid (CPFS1, CPFS2, MPFS) operation check (PSOL CHK)</td><td>[Function]
When [ENTER/START] key is pressed, the selected paper feed solenoid repeats ON for 500ms and OF for 500ms 20times.
When [←/→/10KEY] is pressed, the paper feed solenoid setting is switched.
<table><tr><th>Code number</th><th>Setting</th><th>Remark</th></tr><tr><td>0</td><td>CPFS1</td><td></td></tr><tr><td>1</td><td>CPFS2</td><td>Operation is possible only when No. 2 cassette is installed.</td></tr><tr><td>2</td><td>MPFS</td><td></td></tr></table>
[Operation]
1) Initial display
06-01 PSOL CHK
0:CPFS1
2) [→/10KEY]
06-01 PSOL CHK
1:CPFS2
2) [←/10KEY]
06-01 PSOL CHK
2:MPFS
3) [ENTER/START]
06-01 PSOL CHK
EXECUTING...
4) Returns to the initial display.</td></tr>
<tr><td></td><td>02</td><td>Resist roller solenoid (RRS) operation check (RES.R SOL CHK)</td><td>[Function]
When [ENTER/START] key is pressed, the resist solenoid repeats ON for 500ms and OFF for 500ms 20 times.
[Operation]
1) Initial display
06-02 RES.R SOL CHK
EXECUTING...</td></tr>
<tr><td>7</td><td>01</td><td>Check of warm-up display and aging with JAM (W-UP/AGING)</td><td>[Function]
Copying is repeated to make the set quantity of copies.
When the test command is executed, warm-up is started and warm-up time is added for every second from 0 and displayed.
When warm-up is completed, addition is stopped. When [CA] key is pressed, the ready lamp lights up.
After that, enter the copy quantity with [10KEY] and press [ENTER/START] key to repeat copying of the set quantity (interval 0sec).
To cancel the test command, turn off the power or execute a test command which causes hardware reset.
[Operation]
1) Initial display
07-01 W-UP/AGING
0
2) After 10sec
07-01 W-UP/AGING
10</td></tr>
<tr><td></td><td>06</td><td>Interval aging (INTERVAL AGING)</td><td>[Function]
Copying is repeated to make the set quantity of copies.
When the test command is executed, warm-up is performed and the ready lamp is lighted.
Enter the copy quantity with the [10KEY] and press [ENTER/START] key, and copying is executed to make the set quantity of copies, and the ready state is kept for 3sec, and copying is executed again to make the set quantity of copies. These operations are repeated.
To cancel the test command, turn off the power or execute a test command which executes hardware reset.
[Operation]
1) Initial display (Basic display of copy)
READY TO COPY
100% A4 0</td></tr>
<tr><td></td><td>08</td><td>Shift to copy with warm-up display (W-UP C-MODE)</td><td>[Function]
Enter the test command code, and warm-up is started and warm-up time is counted for every second from 0 and displayed.
When [CA] key is pressed during counting up, "0" is displayed on the display and counting is stopped. However, warm-up is continued.
After completion of warm-up, counting is terminated. (The aging function is removed from test command 7-01.)
[Operation]
1) Initial display
07-08 W-UP C-MODE
0
2) After 10sec
07-08 W-UP C-MODE
10</td></tr>
</table>

Main code	Sub code	Contents	Details of function/operation

8	01	Developing bias output (DVLP BIAS SET.)	**[Function]**
			When [ENTER/START] key is pressed, the developing bias signal is turned ON for 30sec.
			When, however, an actual output value is measured, use test command 25-01.
			After completion of this process, the machine goes into the sub code entry standby mode.
			[Operation]
			1) Initial display
			`08-01 DVLP BIAS SET.`
			`EXECUTING...`

	02	Main charger output (Grid HIGH) (MHV(H) SET.)	**[Function]**
			When [ENTER/START] key is pressed, the main charger is outputted for 30sec in the grid voltage HIGH move.
			After completion of this process, the machine goes into the sub code entry standby mode.
			[Operation]
			1) Initial display
			`08-02 MHV(H) SET.`
			`EXECUTING...`

	03	Main charger output (Grid LOW) (MHV(L) SET.)	**[Function]**
			When [ENTER/START] key is pressed, the main charger is outputted for 30sec in the grid voltage LOW move.
			After completion of this process, the machine goes into the sub code entry standby mode.
			[Operation]
			1) Initial display
			`08-03 MHV(L) SET.`
			`EXECUTING...`

	06	Transfer charger output (THV SET.)	**[Function]**
			When [ENTER/START] key is pressed, the transfer charger is outputted for 30sec.
			After completion of this process, the machine goes into the sub code entry standby mode.
			[Operation]
			1) Initial display
			`08-03 THV SET.`
			`EXECUTING...`

9	01	Duplex motor normal rotation check (DPLX ROT.) (Enabled when Duplex setting is ON)	**[Function]**
			Use the duplex motor Bios to drive the duplex motor in the normal direction (paper exit direction) for 30sec.
			After completion of this process, the machine goes into the sub code entry standby mode.
			[Operation]
			1) Initial display
			`09-01 DPLX ROT.`
			`EXECUTING...`

	02	Duplex motor reverse rotation check (DPLX ROT.REV.) (Enabled when Duplex setting is ON)	**[Function]**
			Use the duplex motor Bios to drive the duplex motor in the reverse direction for 30sec.
			After completion of this process, the machine goes into the sub code entry standby mode.
			[Operation]
			1) Initial display
			`09-02 DPLX ROT.REV.`
			`EXECUTING...`

	04	Duplex motor rotating speed adjustment (DPLX ROT.SPEED) (Enabled when Duplex setting is ON)	**[Function]**
			When this Test Command is executed, the currently set value is displayed.
			Enter the adjustment value with [10KEY] and press [START] key. The entered value is stored and the machine goes into the sub code entry standby mode. The greater the set value is, the higher the speed is. The smaller the set value is, the lower the speed is. (Setting range: 1 - 13, Default: 8)
			[Operation]
			1) Initial display
			`09-04 DPLX ROT.SPEED`
			`8( 1-13)`
			2) [10KEY]
			`09-04 DPLX ROT.SPEED`
			`7( 1-13)`
			3) [ENTER/START]
			`09-04 DPLX ROT.SPEED`
			`7( 1-13)`

<table>
<tr><th>Main code</th><th>Sub code</th><th>Contents</th><th>Details of function/operation</th></tr>
<tr><td>10</td><td>00</td><td>Toner motor operation (TONER MOTOR)</td><td>[Function]
When [ENTER/START] key is pressed, the toner motor is rotated for 30sec.
After completion of this process, the machine goes into the main code entry standby mode.
[Operation]
1) Initial display
10-00 TONER MOTOR
EXECUTING...</td></tr>
<tr><td>14</td><td>00</td><td>Cancel of trouble other than U2 (TRBL CANC.)</td><td>[Function]
Used to cancel troubles other than U2.
* Cancel troubles such as H trouble which writes data into EEPROM, and perform hardware reset.
[Operation]
1) Initial display
14-00 TRBL CANC.
CLEARED</td></tr>
<tr><td>16</td><td>00</td><td>U2 trouble cancel (U2 TRBL CANC.)</td><td>[Function]
Used to cancel U2 trouble.
When [ENTER/START] key is pressed, check sum of the total counter in the EEPROM is rewritten and hardware reset is made.
[Operation]
1) Initial display
16-00 U2 TRBL CANC.
CLEARED</td></tr>
<tr><td>20</td><td>01</td><td>Maintenance counter clear (M-CNT CLR.)</td><td>[Function]
When [ENTER/START] key is pressed, the maintenance count value is cleared and "000,000" is displayed.
[Operation]
1) Initial display
20-01 M-CNT CLR.
CLEARED 000,000</td></tr>
<tr><td>21</td><td>01</td><td>Maintenance cycle setting (M-CYCLE)</td><td>[Function]
The code of the currently set maintenance cycle value is displayed (initial display) and the set data are saved.
<table>
<tr><th>Code</th><th>Setting</th><th>Remark</th></tr>
<tr><td>0</td><td>3,000 sheets</td><td></td></tr>
<tr><td>1</td><td>6,000 sheets</td><td></td></tr>
<tr><td>2</td><td>9,000 sheets</td><td></td></tr>
<tr><td>3</td><td>13,000 sheets</td><td></td></tr>
<tr><td>4</td><td>25,000 sheets</td><td>Default</td></tr>
<tr><td>5</td><td>Free (999,999 sheets)</td><td></td></tr>
</table>
[Operation]
1) The current set value is displayed.
21-01 M-CYCLE
4:25,000 (0-5)
2) [→/10KEY]
21-01 M-CYCLE
5:FREE (0-5)
2) [←/10KEY]
21-01 M-CYCLE
3:13,000 (0-5)
3) [ENTER/START]
21-01 M-CYCLE
5:FREE (0-5)</td></tr>
<tr><td>22</td><td>01</td><td>Maintenance counter display (M-CNT)</td><td>[Function]
The maintenance counter is displayed.
[Operation]
1) Initial display
22-01 M-CNT
,</td></tr>
</table>

Main code	Sub code	Contents	Details of function/operation

22	02	Maintenance preset display (M-CNT PRESET)	**[Function]**
			The quantity (25,000 sheets, etc.) corresponding to the code set with TC21-01 is displayed.
			[Operation]
			1) Initial display
			`22-02 M-CNT PRESET`
			`***,***`

	04	JAM total counter display (JAM TTL CNT)	**[Function]**
			The JAM total counter is displayed.
			[Operation]
			1) Initial display
			`22-04 JAM TTL CNT`
			`***,***`

	05	Total counter display (TTL CNT)	**[Function]**
			The total counter value is displayed.
			[Operation]
			1) Initial display
			`22-05 TTL CNT`
			`***,***`

	06	Developer counter display (DVLP CNT)	**[Function]**
			The developer counter data is acquired and displayed on the LCD.
			[Operation]
			1) Initial display
			`22-06 DVLP CNT`
			`***,***`

	08	SPF counter display (SPF CNT) (Disabled when set to OC)	**[Function]**
			The SPF counter is displayed.
			[Operation]
			1) Initial display
			`22-08 SPF CNT`
			`***,***`

	11	FAX-related counter display (Executable only when the FAX is installed.)	**[Function]**
			The FAX-related counter is displayed.
			[Operation]
			1) Initial display
			`SELECT COUNTER`
			`1:PAGE 2:TIME`
			∗ [CLEAR] key: FAX control is terminated.
			2) Select 1
			`SEND PAGE:xxx,xxx`
			`RECV PAGE:xxx,xxx`
			("xxx,xxx" is the current value.)
			∗ [CLEAR] key: Returns to "1) Initial display".
			2) Select 2
			`TX TIME:xxxx:xx.xx`
			`RX TIME:xxxx:xx.xx`
			("xxxx: xxx. xx" is the current value.)
			∗ [CLEAR] key: Returns to "1) Initial display".

	12	Drum counter display (DRUM CNT)	**[Function]**
			The drum counter is displayed.
			[Operation]
			1) Initial display
			`22-12 DRUM CNT`
			`***,***`

<table>
<tr><th>Main code</th><th>Sub code</th><th>Contents</th><th>Details of function/operation</th></tr>
<tr><td>22</td><td>13</td><td>CRUM type display (CRUM TYPE)</td><td>[Function]
When the test command is executed, the CRUM type currently set (written) in the CRUM chip is displayed.
<table><tr><th>Code number</th><th>CRUM type</th><th>Display item</th></tr><tr><td>00</td><td>Not set</td><td>0</td></tr><tr><td>01</td><td>BTA-A</td><td>BTA-A</td></tr><tr><td>02</td><td>BTA-B</td><td>BTA-B</td></tr><tr><td>03</td><td>BTA-C</td><td>BTA-C</td></tr><tr><td>99</td><td>Conversion</td><td>CONVERSION</td></tr></table>
[Operation]
1) The CRUM type is displayed.
<pre>22-13 CRUM TYPE
01:BTA-A</pre></td></tr>
<tr><td></td><td>14</td><td>ROM version display (ROM VER.)</td><td>[Function]
The P-ROM version is displayed.
Press [←/→/10KEY] to switch the display version.
<table><tr><th>Code number</th><th>Version</th><th>Display item</th></tr><tr><td>0</td><td>Main unit Program</td><td>MAIN PROG.</td></tr><tr><td>1</td><td>F-IMC Program</td><td>F-IMC PROG.</td></tr><tr><td>2</td><td>LCD DATA</td><td>LCD DATA</td></tr></table>
[Operation]
1) Initial display
<pre>22-14 ROM VER.
MAIN PROG.   00.00</pre>2) [→/10KEY]
<pre>22-14 ROM VER.
F-IMC PROG.   00.00</pre>2) [←/10KEY]
<pre>22-14 ROM VER.
LCD DATA   00.00</pre></td></tr>
<tr><td></td><td>16</td><td>Duplex counter display (DPLX CNT) (Enabled when Duplex setting is ON)</td><td>[Function]
The duplex counter is displayed.
[Operation]
1) Initial display
<pre>22-16 DPLX CNT
              ,</pre></td></tr>
<tr><td></td><td>17</td><td>Copy counter display (COPIES CNT)</td><td>[Function]
The copy counter is displayed.
[Operation]
1) Initial display
<pre>22-17 COPIES CNT
              ,</pre></td></tr>
<tr><td></td><td>18</td><td>Printer counter display (PRT.CNT)</td><td>[Function]
The printer counter is displayed.
[Operation]
1) Initial display
<pre>22-18 PRT.CNT
             ,</pre></td></tr>
<tr><td></td><td>19</td><td>Scanner mode counter display (S-MODE CNT)</td><td>[Function]
The scanner mode counter is displayed.
[Operation]
1) Initial display
<pre>22-19 S-MODE CNT
              ,</pre></td></tr>
</table>

Main code	Sub code	Contents	Details of function/operation

22	21	Scanner counter display (SCAN CNT)	**[Function]**
			The scanner counter is displayed.
			[Operation]
			1) Initial display
			`22-21 SCAN CNT`
			`***,***`

	22	SPF JAM counter display (S JAM CNT) (Disabled when set to OC)	**[Function]**
			The SPF JAM counter is displayed.
			[Operation]
			1) Initial display
			`22-22 S JAM CNT`
			`***,***`

24	01	JAM total counter clear (JAM TTL CLR.)	**[Function]**
			When [ENTER/START] key is pressed, the JAM total counter is cleared to 0 and "000,000" is displayed on the LCD.
			[Operation]
			1) Initial display
			`24-01 JAM TTL CLR.`
			`CLEARED 000,000`

	04	SPF counter clear (SPF CLR.) (Disabled when set to OC)	**[Function]**
			When [ENTER/START] key is pressed, the SPF counter value is cleared to 0 and "000,000" is displayed on the LCD.
			[Operation]
			1) Initial display
			`24-04 SPF CLR.`
			`CLEARED 000,000`

	05	Duplex counter clear (DPLX CLR.) (Enabled when Duplex setting is ON)	**[Function]**
			When [ENTER/START] key is pressed, the duplex counter value is cleared to 0, and "000,000" is displayed on the LCD.
			[Operation]
			1) Initial display
			`24-05 DPLX CLR.`
			`CLEARED 000,000`

	06	Developer counter clear (DVLP CLR.)	**[Function]**
			When [ENTER/START] key is pressed, the developer counter value is cleared to 0, and "000,000" is displayed on the LCD.
			[Operation]
			1) Initial display
			`24-06 DVLP CLR.`
			`CLEARED 000,000`

	07	Drum counter clear (DRUM CLR.)	**[Function]**
			When [ENTER/START] key is pressed, the drum counter value is cleared to 0, and "000,000" is displayed on the LCD.
			[Operation]
			1) Initial display
			`24-07 DRUM CLR.`
			`CLEARED 000,000`

	08	Copy counter clear (COPIES CLR.)	**[Function]**
			When [ENTER/START] key is pressed, the copy counter value is cleared to 0, and "000,000" is displayed on the LCD.
			[Operation]
			1) Initial display
			`24-08 COPIES CLR.`
			`CLEARED 000,000`

Main code	Sub code	Contents	Details of function/operation

24	09	Printer counter clear (PRT.CLR.)	**[Function]**
			When [ENTER/START] key is pressed, the printer counter value is cleared to 0, and "000,000" is displayed on the LCD.
			[Operation]
			1) Initial display
			`24-09 PRT.CLR.`
			`CLEARED 000,000`

	10	FAX counter clear (FAX CLR.) (Executable only when the FAX is installed.)	**[Function]**
			When PRINT switch is pressed, the FAX count value is set to 0 and "000,000" is displayed on the LCD.
			[Operation]
			1) Initial display
			`24-10 FAX CLR.`
			`CLEARED 000,000`

	13	Scanner counter clear (SCAN CLR.)	**[Function]**
			When [ENTER/START] key is pressed, the scanner counter value is cleared to 0, and "000,000" is displayed on the LCD.
			[Operation]
			1) Initial display
			`24-13 SCAN CLR.`
			`CLEARED 000,000`

	14	SPF JAM total counter clear (S JAM TTL CLR.) (Disabled when set to OC)	**[Function]**
			When [ENTER/START] key is pressed, the SPF JAM total counter value is cleared to 0, and "000,000" is displayed on the LCD.
			[Operation]
			1) Initial display
			`24-14 S JAM TTL CLR.`
			`CLEARED 000,000`

	15	Scanner mode counter clear (S-MODE CLR.)	**[Function]**
			When [ENTER/START] key is pressed, the scanner mode counter value is cleared to 0, and "000,000" is displayed on the LCD.
			[Operation]
			1) Initial display
			`24-15 S-MODE CLR.`
			`CLEARED 000,000`

25	01	Main motor operation check (MAIN MOTOR CHK)	**[Function]**
			When [ENTER/START] key is pressed, the main motor (and the duplex motor in the case of a duplex model) is operated for 30sec.
			To reduce toner consumption, if the developing unit is installed, the developing bias, the main charger, and the grid are also outputted.
			In this case, laser discharge is required when stopping the motor, the polygon motor is also operated at the same time. Check for installation of the developing unit. If it is not installed, the high voltage above is not outputted and only the motor is rotated.
			To check the developing bias, install the developing unit.
			After completion of 30sec operation, the machine goes into the sub code entry standby mode.
			[Operation]
			1) Initial display
			`25-01 MAIN MOTOR CHK`
			`EXECUTING...`

	10	Polygon motor operation check (LSU CHK)	**[Function]**
			When [ENTER/START] key is pressed, the Bios is called to rotate the polygon motor for 30sec.
			After completion of 30sec operation, the operation is turned off with the Bios and the machine goes into the sub code entry standby mode.
			[Operation]
			1) Initial display
			`25-10 LSU CHK`
			`EXECUTING...`

<table>
<tr><th>Main code</th><th>Sub code</th><th>Contents</th><th>Details of function/operation</th></tr>
<tr><td>26</td><td>02</td><td>RSPF setting (RSPF)</td><td>[Function]
When this test command is executed, the current set RSPF is displayed. Enter the code number corresponding to the desired RSPF and press [ENTER/START] key to save the setting.
<table>
<tr><th>Code number</th><th>RSPF</th><th>Display item</th></tr>
<tr><td>0</td><td>RSPF NO</td><td>RSPF OFF</td></tr>
<tr><td>1</td><td>RSPF YES</td><td>RSPF ON</td></tr>
<tr><td>2</td><td>RSPF YES</td><td>RSPF ON</td></tr>
</table>
[Operation]
The operation is similar to test command 21-01.</td></tr>
<tr><td></td><td>03</td><td>Second cassette setting (2ND TRAY)</td><td>[Function]
When this test command is executed, the current set second cassette is displayed. Enter the code number corresponding to the desired second cassette and press [ENTER/START] key to save the setting.
<table>
<tr><th>Code number</th><th>Second cassette</th><th>Display item</th></tr>
<tr><td>0</td><td>Second cassette NO</td><td>OFF</td></tr>
<tr><td>1</td><td>Second cassette YES</td><td>ON</td></tr>
</table>
[Operation]
The operation is similar to test command 21-01.</td></tr>
<tr><td></td><td>04</td><td>Main unit duplex setting (DPLX)</td><td>[Function]
When this test command is executed, the current set duplex is displayed. Enter the code number corresponding to the desired duplex and press [ENTER/START] key to save the setting.
<table>
<tr><th>Code number</th><th>Duplex</th><th>Display item</th></tr>
<tr><td>0</td><td>Duplex NO</td><td>OFF</td></tr>
<tr><td>1</td><td>Duplex YES</td><td>ON</td></tr>
</table>
[Operation]
The operation is similar to test command 21-01.</td></tr>
<tr><td></td><td>06</td><td>Destination setting (DESTINATION)</td><td>[Function]
When this test command is executed, the current set destination is displayed. Enter the code number corresponding to the desired destination and press [ENTER/START] key to save the setting.
<table>
<tr><th>Code number</th><th>Destination</th><th>Display item</th></tr>
<tr><td>0</td><td>Inch series</td><td>INCH</td></tr>
<tr><td>1</td><td>EX Japan AB series</td><td>AB</td></tr>
<tr><td>2</td><td>Japan AB series</td><td>–</td></tr>
<tr><td>3</td><td>China (EX Japan AB series + China paper support)</td><td>CHINA</td></tr>
</table>
* For Japan AB series, there is no schedule for production.
[Operation]
The operation is similar to test command 21-01.</td></tr>
<tr><td></td><td>07</td><td>Machine conditions check (CPM)</td><td>[Function]
When this test command is executed, the current machine setting is displayed.
<table>
<tr><th>CPM</th><th>Coy quantity</th><th>Remark</th></tr>
<tr><td>10 CPM</td><td>10</td><td></td></tr>
<tr><td>12 CPM</td><td>12</td><td></td></tr>
<tr><td>13 CPM</td><td>13</td><td></td></tr>
<tr><td>14 CPM</td><td>14</td><td></td></tr>
<tr><td>15 CPM</td><td>15</td><td></td></tr>
<tr><td>16 CPM</td><td>16</td><td></td></tr>
</table>
[Operation]
1) The machine setting is displayed.
26-07 CPM
10 CPM</td></tr>
<tr><td></td><td>20</td><td>Rear edge void setting (END EDGE)</td><td>[Function]
When this test command is executed, the current set rear edge void is displayed. Enter the code number corresponding to the desired rear edge void and press [ENTER/START] key to save the setting.
<table>
<tr><th>Code number</th><th>Setting</th><th>Display item</th><th>Remark</th></tr>
<tr><td>0</td><td>Rear edge void NO</td><td>OFF</td><td></td></tr>
<tr><td>1</td><td>Rear edge void YES</td><td>ON</td><td>Default</td></tr>
</table>
[Operation]
The operation is similar to test command 21-01.</td></tr>
</table>

<table>
<tr><th>Main code</th><th>Sub code</th><th>Contents</th><th>Details of function/operation</th></tr>
<tr><td>26</td><td>30</td><td>CE mark support control ON/OFF (CE MARK)</td><td>[Function]
When this test command is executed, the current set CE mark support control is displayed. Enter the code number corresponding to the desired CE mark support control and press [ENTER/START] key to save the setting.
<table><tr><th>Code number</th><th>Setting</th><th>Display item</th><th>Remark</th></tr><tr><td>0</td><td>CE mark support control OFF</td><td>OFF</td><td>Default (100V series)</td></tr><tr><td>1</td><td>CE mark support control ON</td><td>ON</td><td></td></tr></table>
[Operation]
The operation is similar to test command 21-01.</td></tr>
<tr><td></td><td>37</td><td>Cancel of stop at developer life over (DVLP LIFE END)</td><td>[Function]
When this test command is executed, the current setting is displayed. Enter the code number corresponding to the desired setting and press [ENTER/START] key to save the setting.
<table><tr><th>Code number</th><th>Setting</th><th>Display item</th><th>Remark</th></tr><tr><td>0</td><td>Stop at developer life over</td><td>STOP</td><td></td></tr><tr><td>1</td><td>Cancel of stop at developer life over</td><td>NONSTOP</td><td></td></tr></table>
[Operation]
The operation is similar to test command 21-01.</td></tr>
<tr><td></td><td>39</td><td>Memory capacity check (MEM.CHK)</td><td>[Function]
When the test command is executed, the currently installed SDRAM of the main unit is displayed.
<table><tr><th>Code number</th><th>Setting</th><th>Remark</th></tr><tr><td>8</td><td>8 MBYTE</td><td></td></tr></table>
[Operation]
1) Memory capacity display
<pre>26-39 MEM.CHK
8 MBYTE</pre></td></tr>
<tr><td></td><td>40</td><td>Polygon motor OFF time setting (Time required from completion of printing to turning OFF the motor) (LSU MOTOR OFF)</td><td>[Function]
When this test command is executed, the current setting is displayed. Enter the code number corresponding to the desired setting and press [ENTER/START] key to save the setting.
<table><tr><th>Code number</th><th>Setting</th><th>Display item</th><th>Remark</th></tr><tr><td>0</td><td>0sec</td><td>0 SEC.</td><td></td></tr><tr><td>1</td><td>30sec</td><td>30 SEC.</td><td>Default</td></tr><tr><td>2</td><td>60sec</td><td>60 SEC.</td><td></td></tr><tr><td>3</td><td>90sec</td><td>90 SEC.</td><td></td></tr></table>
[Operation]
The operation is similar to test command 21-01.</td></tr>
<tr><td></td><td>42</td><td>Transfer ON timing control setting (TC ON TIMING)</td><td>[Function]
When this test command is executed, the currently set value of the transfer ON timing is displayed (initial display), and the set value is saved. (Setting range: 0 – 9, Default: 5)
<table><tr><th>Code</th><th>Setting</th><th>Remark</th></tr><tr><td>0</td><td>0 msec</td><td></td></tr><tr><td>1</td><td>–40 msec</td><td></td></tr><tr><td>2</td><td>–30 msec</td><td></td></tr><tr><td>3</td><td>–20 msec</td><td></td></tr><tr><td>4</td><td>–10 msec</td><td></td></tr><tr><td>5</td><td>0 msec</td><td>Default</td></tr><tr><td>6</td><td>+10 msec</td><td></td></tr><tr><td>7</td><td>+20 msec</td><td></td></tr><tr><td>8</td><td>+30 msec</td><td></td></tr><tr><td>9</td><td>+40 msec</td><td></td></tr></table>
* The default “5” of transfer ON timing is “330ms passed from PS release.”
* When set to “0,” it is the same as setting to “5.”
[Operation]
The operation is similar to test command 21-01.</td></tr>
</table>

Main code	Sub code	Contents	Details of function/operation
26	43	Side void amount setting (SIDE VOID)	

[Function]

When this test command is executed, the currently set code of the side void quantity is displayed (initial display), and the set data are saved. (Setting range: 0 – 10, Default: 4 (= One side 2.0mm))

Code	Setting	Remark
0	0 mm	
1	0.5 mm	
2	1.0 mm	
3	1.5 mm	
4	2.0 mm	Default
5	2.5 mm	
6	3.0 mm	
7	3.5 mm	
8	4.0 mm	
9	4.5 mm	
10	5.5 mm	

* When the adjustment value is increased by 1, the side void is changed as follows:
  Side void adjustment: The side void is increased by 0.5mm. (The side void of "Set value x 0.5mm" is made.)

[Operation]

1) Initial display

```
26-43 SIDE VOID
            4( 0-10)
```

2) [10KEY]

```
26-43 SIDE VOID
            5( 0-10)
```

3) [ENTER/START]

```
26-43 SIDE VOID
            5( 0-10)
```

Main code	Sub code	Contents	Details of function/operation
26	62	Energy-save mode copy lamp setting (C-LAMP E-S)	

[Function]

Used to set half-ON /OFF of the copy lamp in the pre-heat mode.

When this test command is executed, the current set code number is displayed. Enter the desired code number and press [ENTER/START] key to save the setting.

Code number	Setting	Display item	Remark
0	Copy lamp OFF	OFF	
1	Copy lamp half-ON	ON	Default

[Operation]

The operation is similar to test command 21-01.

Main code	Sub code	Contents	Details of function/operation
30	01	Paper sensor status display (P-SENSOR)	

[Function]

The paper sensor status is displayed on the LCD.

Sensor	Display item	Remark
Paper exit sensor	POD	
No. 1 tray paper width sensor	PD1	
Paper entry sensor	PPD1	
Duplex sensor	PPD2	
No. 2 tray paper feed sensor	PPD3	
New drum cartridge sensor	DRST	

* Since the manual paper feed sensor is a single bypass sensor, its status is not displayed.
* The width sensor is available only in the FAX models.

[Operation]

1) Initial display

```
30-01 P-SENSOR
```

2) When sensor ON

```
30-01 POD  PD1  PD2
PPD1 PPD2 PPD3 DRST
```

<table>
<tr><th>Main code</th><th>Sub code</th><th>Contents</th><th>Details of function/operation</th></tr>
<tr><td>41</td><td>06</td><td>OC cover float detection level (OC FLOAT LEVEL) (Disabled when set to OC)</td><td>[Function]
When this test command is executed, the current set value is displayed. When [ENTER/START] key is pressed, the mirror base unit moves to the SPF scan position to acquire the OC cover float detection level.
When the mirror base unit returns to the home position, the acquired value is displayed.
If the detection level is not acquired, ERR display is made. (Default: 0)
Note that, this test command must be executed with the OC cover closed.
* If the value is 0, float detection is not performed in normal jobs.
[Operation]
1) Initial display
41-06 OC FLOAT LEVEL
0
2) [ENTER/START]
41-06 OC FLOAT LEVEL
EXECUTING...
<Canceling - when C/CA key is pressed->
After canceling, the machine goes into the sub code entry standby mode.
THE JOB IS BEING
CANCELED.
3) When the level is acquired:
41-06 OC FLOAT LEVEL
**** OK
3) When the level is not acquired:
41-06 OC FLOAT LEVEL
**** ERR</td></tr>
<tr><td>43</td><td>01</td><td>Fusing temperature setting (Normal copy) (FU TEMP)</td><td>[Function]
When this test command is executed, the current set code number is displayed. Press [←/→/10KEY] key to change the setting and press [ENTER/START] key to save the setting into the EERPOM. The machine goes into the sub code entry standby mode.
<table><tr><th>Code</th><th>Set temperature (°C)</th><th>Remark</th></tr><tr><td>0</td><td>160</td><td></td></tr><tr><td>1</td><td>165</td><td></td></tr><tr><td>2</td><td>170</td><td></td></tr><tr><td>3</td><td>175</td><td></td></tr><tr><td>4</td><td>180</td><td></td></tr><tr><td>5</td><td>185</td><td></td></tr><tr><td>6</td><td>190</td><td>Default</td></tr><tr><td>7</td><td>195</td><td></td></tr><tr><td>8</td><td>200</td><td></td></tr></table>[Operation]
The operation is similar to test command 21-01.</td></tr>
<tr><td></td><td>04</td><td>Fusing temperature setting in multi coy (FU TEMP MULTI)</td><td>[Function]
For 20th sheet or later in multi copy, the fusing temperature is automatically changed from the temperature set with test command 43-1 to the temperature set with this test command.
When this test command is executed, the current set code number is displayed. Enter the code number and press [ENTER/START] key to change the setting.
<table><tr><th>Code</th><th>Set temperature (°C)</th><th>Remark</th></tr><tr><td>0</td><td>155</td><td></td></tr><tr><td>1</td><td>160</td><td></td></tr><tr><td>2</td><td>165</td><td></td></tr><tr><td>3</td><td>170</td><td>Default</td></tr><tr><td>4</td><td>175</td><td></td></tr><tr><td>5</td><td>180</td><td></td></tr></table>[Operation]
The operation is similar to test command 21-01.</td></tr>
</table>

<table>
<tr><th>Main code</th><th>Sub code</th><th>Contents</th><th>Details of function/operation</th></tr>
<tr><td rowspan="2">43</td><td>05</td><td>Fusing temperature setting in duplex copy (FU TEMP DPLX) (Enabled when Duplex setting is ON)</td><td>[Function]
In the case of duplex copy, the shift temperature set with this test command is applied to the fusing temperature.
When this test command is executed, the current set code number is displayed.
Enter the desired code number and press [ENTER/START] key to save the setting.

<table><tr><th>Code</th><th>Shift temperature (°C)</th><th>Remark</th></tr><tr><td>0</td><td>±0</td><td>Default</td></tr><tr><td>1</td><td>-8</td><td></td></tr><tr><td>2</td><td>-6</td><td></td></tr><tr><td>3</td><td>-4</td><td></td></tr><tr><td>4</td><td>-2</td><td></td></tr><tr><td>5</td><td>±0</td><td></td></tr><tr><td>6</td><td>+2</td><td></td></tr><tr><td>7</td><td>+4</td><td></td></tr><tr><td>8</td><td>+6</td><td></td></tr><tr><td>9</td><td>+8</td><td></td></tr></table>
[Operation]
The operation is similar to test command 21-01.</td></tr>
<tr><td>14</td><td>Fusing start temperature setting (FU TEMP START)</td><td>[Function]
When this test command is started, the currently set code number is displayed.
Press [←/→/10KEY] to switch the setting, and press [ENTER/START] key to save it to the EEPROM. The machine goes to the sub code entry standby mode.

<table><tr><th>Code</th><th>Set temperature (°C)</th><th>Remark</th></tr><tr><td>0</td><td>160</td><td></td></tr><tr><td>1</td><td>165</td><td></td></tr><tr><td>2</td><td>170</td><td></td></tr><tr><td>3</td><td>175</td><td></td></tr><tr><td>4</td><td>180</td><td></td></tr><tr><td>5</td><td>185</td><td></td></tr><tr><td>6</td><td>190</td><td></td></tr><tr><td>7</td><td>195</td><td>Default</td></tr><tr><td>8</td><td>200</td><td></td></tr></table>
[Operation]
The operation is similar to test command 21-01.</td></tr>
</table>

Main code	Sub code	Contents	Details of function/operation
46	01	Copy density adjustment (300dpi) (EXP.LEVEL 300)	See below

[Function]

Copy density is set for each mode.

When this test command is executed, the current se value is displayed in 2 digits (Default: 50).

Change the set value and press [START] key to make a copy under the set value.

When the set value is increased, the copy becomes darker. When the set value is decreased, the copy becomes lighter.

In this case, only Exp.3 copy is made. When, however, the setting is made to make darker copy, Exp.1 and Exp.5 copies also become darker. When made to lighter copy, Exp1. and Exp.5 copies become lighter, too.

Press [←/→] key to switch the mode. The set value of the selected mode is displayed on the LCD. (Adjustment value: 1 – 99)

The setting procedure of the magnification ratio is the same as that to copy operation.

Mode	Display item	Default	LED
AE mode (300dpi)	AE	50	COPY mode lamp
TEXT mode (300dpi)	TEXT	50	PRINT mode lamp
PHOTO mode	PHOTO	50	SCAN mode lamp
TS mode (TEXT)(300dpi)	TSTXT	50	PRINT mode lamp SCAN mode lamp
TS mode (AE)(300dpi)	TSAE	50	COPY mode lamp SCAN mode lamp

[Operation]

1) Initial display

```
46-01 EXP.LEVEL 300
AE    100% 50( 1-99)
```

2) [←] Mode selection

```
46-01 EXP.LEVEL 300
TSAE  100% 50( 1-99)
```

2) [→] Mode selection

```
46-01 EXP.LEVEL 300
TEXT  100% 50( 1-99)
```

3) [10KEY] Value entry

```
46-01 EXP.LEVEL 300
AE    100% 62( 1-99)
```

4) [START] Fixing and printing value (No change on the LCD)

* Print is started in the set mode.

```
46-01 EXP.LEVEL 300
AE    100% 62( 1-99)
```

4) To fix the set value without printing, press [Enter] key.

```
46-01 EXP.LEVEL 300
AE    100% 62( 1-99)
```

* To cancel manual feed paper empty MSG, press any key.
* When performing the AE mode exposure adjustment, place the test chart on the document table so that the center area of 10cm is not covered.

Main code	Sub code	Contents	Details of function/operation
46	02	Copy density adjustment (600dpi) (EXP.LEVEL 600)	See below

[Function]

Copy density is set for each mode.

When this test command is executed, the current se value is displayed in 2 digits (Default: 50).

Change the set value and press [START] key to make a copy under the set value.

When the set value is increased, the copy becomes darker. When the set value is decreased, the copy becomes lighter.

In this case, only Exp.3 copy is made. When, however, the setting is made to make darker copy, Exp.1 and Exp.5 copies also become darker. When made to lighter copy, Exp1. and Exp.5 copies become lighter, too.

Press [←/→] key to switch the mode. The set value of the selected mode is displayed on the LCD. (Adjustment value: 1 – 99)

Mode	Display item	Default	LED
AE mode (600dpi)	AE	50	COPY mode lamp
TEXT mode (600dpi)	TEXT	50	PRINT mode lamp
PHOTO mode	PHOTO	50	SCAN mode lamp
TS mode (TEXT) (600dpi)	TSTXT	50	PRINT mode lampSCAN mode lamp
TS mode (AE) (600dpi)	TSAE	50	COPY mode lampSCAN mode lamp

[Operation]

The operation is similar to test command 46-01.

<table>
<tr><th>Main code</th><th>Sub code</th><th>Contents</th><th>Details of function/operation</th></tr>
<tr><td>46</td><td>12</td><td>Density adjustment in the FAX mode (Collective adjustment) (Executable only when the FAX is installed.)</td><td>[Function]
When [START] key is pressed, scan is executed with the entered exposure adjustment value and the data stored on the FAX side is rewritten into the entered value.
All data of the exposure adjustment values are rewritten into the same value.
For the density adjustment table data, refer to TC46-13 (density adjustment (normal text) in the FAX mode).
[Operation]
1) Initial display
ADJUST EXP. AUTO
XX
("XX" is the exposure adjustment value of normal text stored on the FAX side.)
2) Enter a 2-digit value as the exposure adjustment value.
ADJUST EXP. AUTO
YY
("YY" is the entered exposure adjustment value.)
3) Scan is started (self print), and the LED of [START] key is turned off.
ADJUST EXP. AUTO
SCAN YY
4) Print is started (self print).
ADJUST EXP. AUTO
PRINT YY
After completion of printing, returns to “2)” display.</td></tr>
<tr><td></td><td>13</td><td>FAX mode density adjustment (normal text) (Executable only when the FAX is installed.)</td><td>[Function]
Scan is started with the exposure adjustment value entered with [START] key, and the stored data of the selected mode on the FAX side is rewritten into the input value.
Density adjustment value data table
<table>
<tr><th>Mode</th><th>Photo</th><th>Exposure adjustment value</th></tr>
<tr><td>STD (Normal text)</td><td>off</td><td></td></tr>
<tr><td rowspan="2">Fine (Fine text)</td><td>on</td><td></td></tr>
<tr><td>off</td><td></td></tr>
<tr><td rowspan="2">Sfine (Super fine)</td><td>on</td><td></td></tr>
<tr><td>off</td><td></td></tr>
</table>When initializing each data: 50
[Operation]
1) Initial display
ADJUST EXP. STD
XX
("XX" is the corresponding exposure adjustment value of normal text mode stored on the FAX side.)
2) Enter a 2-digit value as the exposure adjustment value with [10KEY].
ADJUST EXP. STD
YY
("YY" is the entered exposure adjustment value.)
3) Scan is started (self print), and the LED of [START] key is turned off.
ADJUST EXP. STD
SCAN YY
4) Print is started (self print).
ADJUST EXP. STD
PRINT YY
After completion of printing, returns to “2)” display.</td></tr>
<tr><td></td><td>14</td><td>FAX mode density adjustment (Fine text) (Executable only when the FAX is installed.)</td><td>[Function]
When [START] key is pressed, scan is started with the entered exposure adjustment value and the data of the selected mode on the FAX side is changed to the entered value.
For the density adjustment value table data, refer to TC46-13 (FAX mode density adjustment (normal text).)
[Operation]
1) Initial display
ADJUST EXP. FINE
XX
("XX" is the corresponding exposure adjustment value of the fine text mode stored on the FAX side.)
2) Enter a 2-digit value as the exposure adjustment value with [10KEY].
ADJUST EXP. FINE
YY
("YY" is the entered exposure adjustment value.)
3) Scan start (self print)
ADJUST EXP. FINE
SCAN YY
4) Print start (self print)
ADJUST EXP. AUTO
PRINT YY
After completion of printing, returns to “2)” display.</td></tr>
</table>

<table>
<tr><th>Main code</th><th>Sub code</th><th>Contents</th><th>Details of function/operation</th></tr>
<tr><td>46</td><td>15</td><td>FAX mode density adjustment (Super fine) (Executable only when the FAX is installed.)</td><td>[Function]
When [START] key is pressed, scan is started with the entered exposure adjustment value and the data of the selected mode on the FAX side is changed to the entered value.
For the density adjustment value table data, refer to TC46-13 (FAX mode density adjustment (normal text).)
[Operation]
1) Initial display
<code>ADJUST EXP. S-FINE</code>
<code>XX</code>
("XX" is the corresponding exposure adjustment value of the super fine mode stored on the FAX side.)
2) Enter a 2-digit value as the exposure adjustment value with [10KEY].
<code>ADJUST EXP. S-FINE</code>
<code>YY</code>
("YY" is the entered exposure adjustment value.)
3) Scan start (self print)
<code>ADJUST EXP. S-FINE</code>
<code>SCAN YY</code>
4) Print start (self print)
<code>ADJUST EXP. S-FINE</code>
<code>PRINT YY</code>
After completion of printing, returns to “2)” display.</td></tr>
<tr><td></td><td>18</td><td>Image contrast adjustment (300dpi) (GAMMA 300)</td><td>[Function]
Contrast is set for each mode.
When this test command is executed, the current se value is displayed in 2 digits (Default: 50).
Change the set value and press [START] key to make a copy under the set value.
When the set value is increased, the contrast becomes higher. When the set value is decreased, the contrast becomes lower.
In this case, only Exp.3 copy is made. When, however, the setting is made to make higher contrast, Exp.1 and Exp.5 copies also become in higher contrast. When made to a lower contrast, Exp1. and Exp.5 copies become lower contrast, too.
Press [←/→] key to switch the mode. The set value of the selected mode is displayed on the LCD. (Adjustment value: 1 – 99)
<table>
<tr><th>Mode</th><th>Display item</th><th>Default</th><th>LED</th></tr>
<tr><td>AE mode (300dpi)</td><td>AE</td><td>50</td><td>COPY mode lamp</td></tr>
<tr><td>TEXT mode (300dpi)</td><td>TEXT</td><td>50</td><td>PRINT mode lamp</td></tr>
<tr><td>PHOTO mode</td><td>PHOTO</td><td>50</td><td>SCAN mode lamp</td></tr>
<tr><td>TS mode (TEXT) (300dpi)</td><td>TSTXT</td><td>50</td><td>PRINT mode lamp
SCAN mode lamp</td></tr>
<tr><td>TS mode (AE) (300dpi)</td><td>TSAE</td><td>50</td><td>COPY mode lamp
SCAN mode lamp</td></tr>
</table>
∗ No density display on LCD.
[Operation]
The operation is similar to test command 46-01.</td></tr>
</table>

Main code	Sub code	Contents	Details of function/operation
46	19	Exposure mode setting (AE MODE)	**[Function]** <γ table setting> When this test command is executed, the code number of the current set gamma table is displayed. (Default: Japan -1/Ex Japan -2) Enter the code number corresponding to the desired gamma table, and press [←/→] key to change the mode and write into the EEPROM. <AE operation mode> When setting the γ table, press [→] key to change to the AE operation mode, and the current set code number of the AE operation mode is displayed. (Default: 0) Enter the code number corresponding to the desired AE operation mode and press [←/→] key to change the mode and write into the EEPROM. <PHOTO image process setting> When [→] key is pressed in AE operation mode setting, the mode is changed to the PHOTO image process setting and the code number of the current set PHOTO image process setting is displayed. (Default: 0) Enter the code number corresponding to the desired PHOTO image process setting and press [←/→] key to change the mode and write into the EEPROM.

Mode	Display item	Code number	Setting content	Remark
γ	GAMMA	1	Image quality priority mode	Japan default
		2	Toner consumption priority mode	EX Japan default
AE	AE	0	Lead edge stop	Default
		1	Real time process	
PHOTO	PHOTO	1	Error diffusion process	Default
		2	Dither process	

[Operation]

1) Initial display
<γ table setting>

```
46-19 AE MODE
GAMMA        2( 1-2)
```

2) [→] Mode selection

```
46-19 AE MODE
AE           0( 0-1)
```

2) [←] Mode selection

```
46-19 AE MODE
PHOTO        1( 1-2)
```

3) [10KEY] Value input

```
46-19 AE MODE
AE           1( 0-1)
```

4) [ENTER/START] Save the set value. The machine goes to the sub code entry standby mode.

Main code	Sub code	Contents	Details of function/operation
46	20	SPF exposure correction (EXP.LEVEL SPF) (Disabled when set to OC)	**[Function]** Used to adjust the exposure correction amount in the SPF mode. The adjustment is made by adjusting Vref voltage variation for the OC mode. When this test command is executed, the current set value is displayed in 2 digits (Default: 50). Change the set value and press [START] key to save the setting and make a copy. When the set value is increased, copy becomes darker. When the set value is decreased, copy becomes lighter. (Adjustment range: 1 – 99)

Mode	Display item	Default	Remark
SPF	SPF	50	

[Operation]
The operation is similar to test command 46-01.

Main code	Sub code	Contents	Details of function/operation
46	29	Image contrast adjustment (600dpi) (GAMMA 600)	See below

[Function]
Contrast is set for each mode.

When this test command is executed, the current se value is displayed in 2 digits (Default: 50).

Change the set value and press [START] key to make a copy under the set value.

When the set value is increased, the contrast becomes higher. When the set value is decreased, the contrast becomes lower.

In this case, only Exp.3 copy is made. When, however, the setting is made to make higher contrast, Exp.1 and Exp.5 copies also become in higher contrast. When made to a lower contrast, Exp1. and Exp.5 copies become lower contrast, too.

Press [←/→] key to switch the mode. The set value of the selected mode is displayed on the LCD. (Adjustment value: 1 – 99)

Mode	Display item	Default	LED
AE mode (600dpi)	AE	50	COPY mode lamp
TEXT mode (600dpi)	TEXT	50	PRINT mode lamp
PHOTO mode	PHOTO	50	SCAN mode lamp
TS mode (TEXT)(600dpi)	TSTXT	50	PRINT mode lamp SCAN mode lamp
TS mode (AE)(600dpi)	TSAE	50	COPY mode lamp SCAN mode lamp

∗ No density display on LCD.

[Operation]
The operation is similar to test command 46-01.

Main code	Sub code	Contents	Details of function/operation
46	30	AE limit adjustment (AE LIMIT)	See below

[Function]
Used to set the limit value in AE and AE (toner save).
Change the setting and press [ENTER/START] key to write the setting into the EEPROM. The machine goes into the sub code entry standby mode.
By pressing [←/→] key, setting is changed. (Setting range: 0 – 31, Default: 0)

Mode	Display item	Remark
Limit value for AE	AE	
Limit value for AE (toner save)	TSAE	

<Remark>

When test command 26-06 (Destination setting) or test command 46-19 Auto Exposure mode is changed, the setting of this test command is also changed to the default in connection.

[Operation]
The operation is similar to test command 46-19.

Main code	Sub code	Contents	Details of function/operation
46	31	Image sharpness adjustment (SHARPNESS)	See below

[Function]
Used to adjust sharpening/blurring of image in each mode.

Image quality	Setting No	Remark
Blurring	0	
Standard	1	Default
Sharpening	2	

When this test command is executed, warm-up and shading are performed and the current set value is displayed. (Default: 1)
Change the set value and press [START] key to make a copy under the set conditions.
To change the mode, press [←/→] key. The code number of the selected mode is dip0slayed on the LCD.

Mode	Display item	Default setting	LED
AE mode	AE	1	COPY mode lamp
TEXT mode	TEXT	1	PRINT mode lamp
PHOTO mode	PHOTO	1	SCAN mode lamp
TS mode (TEXT)	TSTXT	1	PRINT mode lamp SCAN mode lamp
TS mode (AE)	TSAE	1	COPY mode lamp SCAN mode lamp

[Operation]
The operation is similar to test command 46-01.

<table>
<tr><th>Main code</th><th>Sub code</th><th>Contents</th><th>Details of function/operation</th></tr>
<tr><td>46</td><td>32</td><td>Copier color reproduction setting (COLOR REAPPEAR)</td><td>
[Function]
Used to set color reproduction in each mode. Colors easy to be copied and colors difficult to be copied can be switched.
<table>
<tr><th>Set value</th><th>Colors easy to be copied</th><th>Colors difficult to be copied</th></tr>
<tr><td>0</td><td>Purple, Blue, Red</td><td>Yellow, Green, Water blue</td></tr>
<tr><td>1</td><td>Water blue, Green, Blue</td><td>Purple, Red, Yellow</td></tr>
<tr><td>2</td><td>Yellow, Red, Green</td><td>Blue, Water blue, Purple</td></tr>
</table>
* This setting has virtually no effect on black-and-white documents.
When this test command is executed, warm-up and shading are performed and the current set value is displayed. (Default: 0)
Press [START] key to make a copy under the set conditions . At that time, color components are changed for used in copying.
To change the mode, press [←/→] key. The code number of the selected mode is dip0slayed on the LCD.
<table>
<tr><th>Specification component</th><th>Setting No</th><th>Remark</th></tr>
<tr><td>Green</td><td>0</td><td>Default</td></tr>
<tr><td>Red</td><td>1</td><td></td></tr>
<tr><td>Blue</td><td>2</td><td></td></tr>
</table>
<table>
<tr><th>Mode</th><th>Display item</th><th>Default setting</th><th>LED</th></tr>
<tr><td>AE mode (including TS)</td><td>AE</td><td>0</td><td>COPY mode lamp</td></tr>
<tr><td>TEXT mode (including TS)</td><td>TEXT</td><td>0</td><td>PRINT mode lamp</td></tr>
<tr><td>PHOTO mode</td><td>PHOTO</td><td>0</td><td>SCAN mode lamp</td></tr>
</table>
[Operation]
The operation is similar to test command 46-01.
</td></tr>
<tr><td></td><td>39</td><td>FAX mode sharpness adjustment (Executable only when the FAX is installed.)</td><td>
[Function]
When [START] key is pressed, scan is started with the entered sharpness adjustment value, and the data of the selected mode stored on the FAX side is changed to the entered value.
Sharpness adjustment value data table
<table>
<tr><th>Mode</th><th>Sharpness adjustment value</th></tr>
<tr><td>1: STD</td><td></td></tr>
<tr><td>2: FINE</td><td></td></tr>
<tr><td>3: S-FINE</td><td></td></tr>
<tr><td>4: FINE/PHOTO</td><td></td></tr>
<tr><td>5: S-FINE/PHOTO</td><td></td></tr>
</table>
When initializing each data: 1
[Operation]
1) Initial display
SHARPNESS SETTING
PRESS ←,→
2) [←/→] or after 2sec
Every time when [→] key is pressed, the second line is changed in the sequence of No. 1 → 2 → 3 → 4 → 5 → 1.
When [←] key is pressed, the sequence is reversed.
SHARPNESS SET (1-5)
1:STD
3) Select the arrow key 1-5, and the LED of [START] key is lighted.
SHARPNESS SETTING
ZZZZ(0-2) X
("ZZZZ" is the mode selected among STD, FINE, S-FINE, FINE/PHOTO, and S-FINE/PHOTO.)
("X" is the corresponding sharpness adjustment value of the selected mode stored on the FAX side.)
* [CLEAR] key: Returns to “2)” display.
4) Enter a one-digit value (0-2) as the sharpness adjustment value with [10KEY].
SHARPNESS SETTING
ZZZZ(0-2) Y
("Y" is the entered sharpness adjustment value.)
* [CLEAR] key: Returns to “2)” display.
5) Scan start (self print)
SHARPNESS SETTING
SCAN Y
6) Print start (self print)
SHARPNESS SETTING
PRINT Y
After completion of printing, returns to “4)” display.
</td></tr>
</table>

Main code	Sub code	Contents	Details of function/operation
48	01	Main scan/sub scan direction magnification ratio (COPY MAG.)	**[Function]** Used to adjust the magnification ratio in the main scan (front/rear) direction and sub scan direction. Enter the adjustment value with [10KEY]. Press [START] key to save the set value and make a copy. (When the adjustment value is increased by 1, the magnification ratio is increased by 0.1%.) The adjustment mode can be changed by pressing [←/→] key. (Adjustment range: 1 – 99, Default: 50) <table><tr><th>Mode</th><th>Display item</th><th>Default value</th><th>LED</th></tr><tr><td>Main scan direction magnification ratio</td><td>F-R</td><td>50</td><td>PRINT mode lamp</td></tr><tr><td>OC mode sub scan direction magnification ratio</td><td>SCAN</td><td>50</td><td>SCAN mode lamp</td></tr></table> **[Operation]** The operation is similar to test command 46-01.
	05	RSPF mode sub scan direction magnification ratio in copying (RSPF MAG.) (Disabled when set to OC)	**[Function]** Used to display the current RSPF mode sub scan direction magnification ratio on the LCD. When [START] key is pressed, the entered data is acquired and saved into the EEPROM, and a copy is made. (When the set value is increased by 1, the magnification ratio is increased by 0.1%.) (Adjustment range: 1 – 99, Default: 50) When adjusting the RSPF, use [2-SIDED COPY] key to select single/duplex after entering the one page print mode, performing 2-page single copy. For printing, regardless of the density mode and the density level, Density mode = MANUAL Density level = 3 <table><tr><th>Mode</th><th>Display item</th><th>Default</th><th>LED</th></tr><tr><td>Sub scan magnification ratio adjustment on the surface of RSPF document</td><td>SIDE1</td><td>50</td><td>COPY mode lamp</td></tr><tr><td>Sub scan magnification ratio adjustment on the surface of RSPF document *1</td><td>SIDE2</td><td>50</td><td>PRINT mode lamp</td></tr></table> * When there is no document in RSPF, copy is inhibited. *1: Only when RSPF is installed. If installed, skipped. **[Operation]** The operation is similar to test command 46-01.

Main code	Sub code	Contents	Details of function/operation
49	01	Download mode (DOWNLOAD MODE)	**[Function]** When this test command is executed, “DOWNLOAD MODE" is displayed on the LCD and the machine goes into the program writing mode from PC to Flash ROM. Use the writing tool on the PC and write the program. During writing, the display shows as follows: After completion of download, turn OFF/ON the power to reset.

Status	Display item
Download data receiving	RECEIVING
Loader function transfer	LOADER COPYING
Date delete start	FLASH ERASE
Data write (Boot section)	BOOT WRITING
Data write (Program section)	PROGRAM WRITING
Data write (EEPROM)	E2PROM WRITING
Data write (LCD)	LCD DATE WRITING
During SUM CHECK	FLASH ROM SUM CHECK
During BOOT SUM CHECK	BOOT SUM CHECK
During EEPROM SUM CHECK	EEPROM SUM CHECK
Download complete	DOWNLOAD COMPLETE!

In case of an error in download, the following message is displayed on the LCD.

Error status	Display item
PC data receiving	E-01 PC TRANS
Loader function transfer	E-02 LOADER COPY
FLASH ROM delete	E-03 FLASH ERASE
Boot section FLASH ROM write	E-04 BOOT WRITE
Program section FLASH ROM write	E-05 PROGRAM WRITE
Loader section SUM CHECK	E-06 LOADER SUM
Boot section SUM CHECK	E-07 BOOT SUM
Program section SUM CHECK	E-08 PROGRAM SUM
E2PROM SUM CHECK	E-09 E2PROM SUM
E2PROM write	E-10 E2PROM WRITE
E2PROM read Verify	E-11 E2PROM READ
E2PROM collating Verify	E-12 E2PROM COLLATE
Boot section lens check	E-13 BOOT LENGTH
Program section lens check	E-14 PROGRAM LENGTH
E2PROM lens check	E-15 E2PROM LENGTH
Total data size check	E-16 DATE SIZE
IMC communication error	E-17 IMC TRANS
IMC FRASH ROM write	E-18 IMC FLASH WRITE
LCD section lens check	E-19 LCD DATE LENGTH
LCD section FLASH ROM write	E-20 LCD DATE WRITE
LCD section SUM CHECK	E-21 LCD DATE SUM

To enter the download mode, there is a method to use key operations as well as to use a test command. With the power OFF, press and hold [CA] + [←], turn on the power.

[Operation]

1) Initial display

```
DOWNLOAD MODE
```

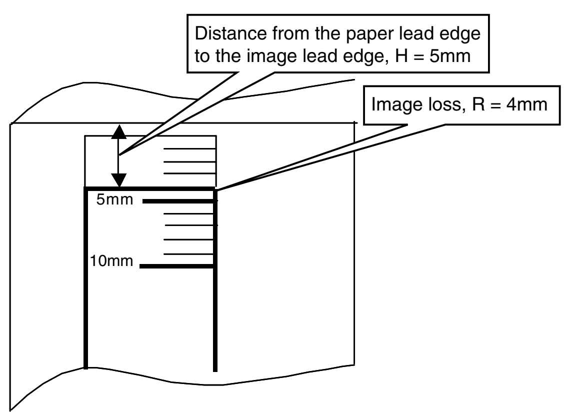
<table>
<tr><th>Main code</th><th>Sub code</th><th>Contents</th><th>Details of function/operation</th></tr>
<tr><td>50</td><td>01</td><td>Lead edge image position (LEAD EDGE)</td><td>

[Function]
Used to adjust the copy image position and the lead edge void amount on copy paper. The adjustment is made by adjusting the image scan start position at 100% and the print start position (resist roller ON timing). When this test command is executed, the current set value is displayed in 2 digits. (Center value: 50)
When [←/→] key is pressed, the setting mode and the display are changed.
Enter the adjustment value and press [START] key to save the set value and make a copy.
When the adjustment is made by the main cassette paper feed, the adjustment values of all the paper feed ports become the same. (When the set value is increased by 1, shift is made by 0.1mm.)

<table>
<tr><th>Mode</th><th>Display item</th><th>Default</th><th>LED</th></tr>
<tr><td>Print start position (Main cassette paper feed)</td><td>TRAY1</td><td>50</td><td>COPY mode lamp
Main cassette lamp</td></tr>
<tr><td>(*) Print start position (2nd cassette paper feed)</td><td>TRAY2</td><td>50</td><td>COPY mode lamp
2nd cassette lamp</td></tr>
<tr><td>Print start position (Manual paper feed)</td><td>MFT</td><td>50</td><td>COPY mode lamp
Manual feed lamp</td></tr>
<tr><td>Image lead edge void amount</td><td>DEN-A</td><td>50</td><td>PRINT mode lamp</td></tr>
<tr><td>Image scan start position</td><td>RRC-A</td><td>50</td><td>SCAN mode lamp</td></tr>
<tr><td>Image rear edge void amount</td><td>DEN-B</td><td>50</td><td>COPY mode lamp
PRINT mode lamp
SCAN mode lamp</td></tr>
</table>

(*): Support for the installation models. For non-installation models, skip.

[Adjustment procedure]
1) Set the print start position (A: COPY mode lamp ON), the lead edge void amount (B: PRINT mode lamp ON), the scan start position (C: SCAN mode lamp) to zero, and make a copy of the scale at 100%.
2) Measure the image loss (Rmm) of the scale.
Set C = 10 x R (mm). (Example: Set to 40.)
When the value of C is increased by 10, the image loss is decreased by 1mm. (Default: 50)
3) Measure the distance (Hmm) from the paper lead edge to the image print start position.
Set A = 10 x H (mm). (Example: Set to 50.)
When the value of A is increased by 10, the image lead edge is moved to the paper lead edge by 1mm. (Default: 50).
4) Set the lead edge void amount to B = 50 (2.5mm). (Default: 50)
When the value of B is increased by 10, the void is extended by about 0.1mm. (For 25 or less, however, the void amount is regarded as 0.)
* The SPF adjustment is made by adjusting the SPF image scan start position after OC adjustment.
* When paper is discharged, the shifter is operated.
(Example)



[Operation]
The operation is similar to test command 46-01.
</td></tr>
</table>

<table>
<tr><th>Main code</th><th>Sub code</th><th>Contents</th><th>Details of function/operation</th></tr>
<tr><td>50</td><td>06</td><td>Copy lead edge position adjustment (RSPF) (RSPF EDGE) (Disabled when set to OC)</td><td>[Function]
Used to adjust the RSPF copy lead edge.
When the adjustment value of the document scan position adjustment is increased by 1, the scan start timing is advanced by 0.1mm.
The print result is shifted to the opposite direction of the scan start position.
The adjustment mode can be changed by pressing [←/→] key. (Adjustment range: 1 – 99, Default:50)
When scanning a back surface of document, the mode must be changed to operate the RSPF by pressing [2-SIDED COPY] key.
<table>
<tr><th>Mode</th><th>Display item</th><th>Default</th><th>LED</th></tr>
<tr><td>Front surface document scan position adjustment</td><td>SIDE1</td><td>50</td><td>COPY mode lamp</td></tr>
<tr><td>(*) Back surface document scan position adjustment</td><td>SIDE2</td><td>50</td><td>PRINT mode lamp</td></tr>
<tr><td>Rear edge void adjustment (RSPF)</td><td>END</td><td>50</td><td>SCAN mode lamp</td></tr>
</table>
(*) : Support for the installation models. For non-installation models, skip.
* When there is no document in the RSPF, copy is inhibited.
* When paper is discharged, the shifter is operated.
[Operation]
The operation is similar to test command 46-01.</td></tr>
<tr><td></td><td>10</td><td>Print center offset adjustment (PRT.OFF-CENTER)</td><td>[Function]
Used to adjust the center offset position of copy images on copy paper and that in scanning document.
When this test command is executed, the current set value is displayed.
Enter the adjustment value and press [START] key to save the setting and make a copy. (When the set value is changed by 1, the center is shifted by 0.1mm.)
When the adjustment value is increased, the center is shifted to right. When decreased, the center is shifted to left.
The modes can be selected by pressing [←/→] key.
When the set value is changed largely, the area outside the shading area may be scanned to cause black streaks on the edges. When the RSPF is used, select the mode for use of the RSPF by [2-SIDED COPY] key.
<table>
<tr><th>Mode</th><th>Display item</th><th>Default</th><th>LED</th></tr>
<tr><td>Print center offset (Main cassette paper feed)</td><td>TRAY1</td><td>50</td><td>COPY mode lamp
Main cassette lamp</td></tr>
<tr><td>(*) Print center offset (2nd cassette paper feed)</td><td>TRAY2</td><td>50</td><td>COPY mode lamp
2nd cassette lamp</td></tr>
<tr><td>Print center offset (Manual paper feed)</td><td>MFT</td><td>50</td><td>COPY mode lamp
Manual feed lamp</td></tr>
<tr><td>(*) 2nd print center offset (Main cassette paper feed)</td><td>SIDE2</td><td>50</td><td>PRINT mode lamp
Main cassette lamp</td></tr>
</table>
(*) : Support for the installation models. For non-installation models, skip.
* In the 2nd print center offset adjustment, print is made forcibly as 1to2/Short Edge from OC regardless of duplex setting.
* When paper is discharged, the shifter is operated.
[Operation]
The operation is similar to test command 46-01.</td></tr>
<tr><td></td><td>12</td><td>Document feed off-center adjustment (ORG.OFF-CENTER)</td><td>[Function]
Used to adjust document scan off-center adjustment.
The adjustment modes can be selected by pressing [←/→] key. (Adjustment range: 1 – 99, Default:50)
When the adjustment value is increased, the print result is shifted to left.
<table>
<tr><th>Mode</th><th>Display item</th><th>Default</th><th>LED</th></tr>
<tr><td>Platen document scan</td><td>OC</td><td>50</td><td>COPY mode lamp</td></tr>
<tr><td>(*) SPF document front scan</td><td>SPF</td><td>50</td><td>PRINT mode lamp</td></tr>
<tr><td>(*) RSPF document back scan</td><td>RSPF</td><td>50</td><td>SCAN mode lamp</td></tr>
</table>
(*) : Support for the installation models. For non-installation models, skip.
* When paper is discharged, the shifter is operated.
[Operation]
The operation is similar to test command 46-01.</td></tr>
</table>

<table>
<tr><th>Main code</th><th>Sub code</th><th>Contents</th><th>Details of function/operation</th></tr>
<tr><td>50</td><td>18</td><td>Memory reverse position adjustment in duplex copy (DPLX REVERSE) (Enabled when Duplex setting is ON with OC or SPF set)</td><td>

[Function]
When this test command is executed, the current set correction value is displayed.

Enter the correction value and press [START] key to save the entered correction value. (Correction value range; 1 – 99, Default: 50)

For S-D mode front surface print and print of even paged in D-S mode, reverse memory copy operation is performed from the rear edge of documents.

When, therefore, the print position adjustment of output images is required, adjust as follows:

In the reverse memory coping, when the document scan is made in the arrow direction, the output image is printed from the rear edge of scan image,

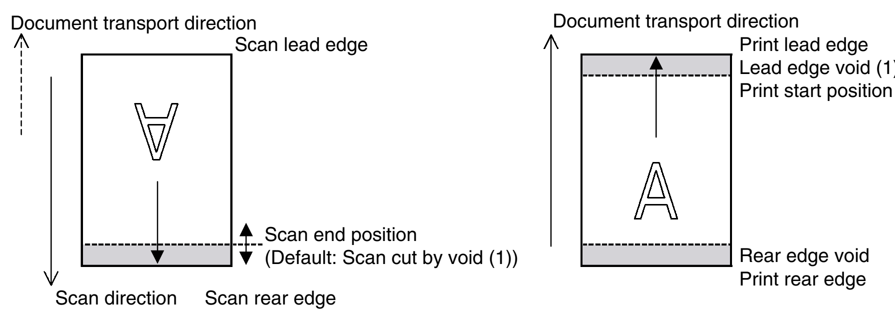
When, therefore, the print lead edge is shifted, set the reference chart so that the reference position is on the rear edge, and use this test command to adjust the set value so that the print lead edge is matched.

Since printing is made from the image data most lately stored in memory to the lead edge data from the print start position, the image lead edge adjustment is made by changing the end data position stored in memory by the set value of this test command.

Since it is performed by changing the scan end position, the image position adjustment is made by changing the scan end position and the end data stored in memory.

<table>
<tr><th>Mode</th><th>Display item</th><th>Default</th><th>LED</th></tr>
<tr><td>OC memory reverse output position</td><td>OC</td><td>50</td><td>COPY mode lamp</td></tr>
<tr><td>SPF memory reverse output position *1</td><td>SPF</td><td>50</td><td>PRINT mode lamp</td></tr>
</table>

*1: Only when SPF/RSPF is installed. If installed, skipped.



* The initial value of duplex setting is "1to2/Long Edge" for the duplex model, or "2to1" for the simplex model.
* When paper is discharged, the shifter is operated.

[Operation]
The operation is similar to test command 46-01.
</td></tr>
<tr><td></td><td>19</td><td>Duplex copy rear edge void adjustment (DPLX END EDGE) (Enabled when Duplex setting is ON)</td><td>

[Function]
Used to adjust the rear edge void amount in duplex copy.

When this test command is executed, the current set value is displayed in 2 digits. (Center value: 50.)
The adjustment modes can be selected by pressing [←/→] key. (Adjustment range; 1 – 99)

Enter the adjustment value and press [START] key to save the set value and make a copy. (The paper information is cleared for every copy.)

When the set value is increased by 1, the void amount is increased by about 0.1mm.

<table>
<tr><th>Mode</th><th>Display item</th><th>Default</th><th>LED</th></tr>
<tr><td>Paper rear edge void amount</td><td>DEN-B</td><td>50</td><td>PRINT mode lamp</td></tr>
<tr><td>Print start position (Duplex back surface)</td><td>RRC-D</td><td>50</td><td>SCAN mode lamp</td></tr>
</table>

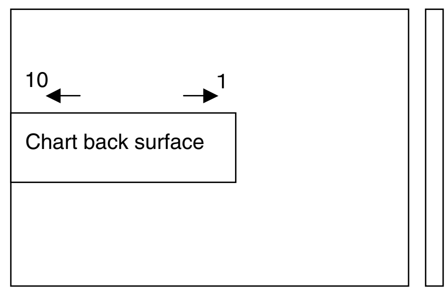
* The initial value for duplex setting is "1to2/Short Edge" for the OC/SPF setting, or "2to2" for the RSPF setting.
* When paper is discharged, the shifter is operated.

[Operation]
The operation is similar to test command 46-01.
</td></tr>
</table>

<table>
<tr><th>Main code</th><th>Sub code</th><th>Contents</th><th>Details of function/operation</th></tr>
<tr><td>51</td><td>02</td><td>Resist amount adjustment (RESIST ADJ.)</td><td>
[Function]
Used to adjust the contact pressure of the main unit resist roller and the RSPF resist roller onto paper. When this test command is executed, the current set value is displayed.
The adjustment modes can be selected by pressing [←/→] key.
Enter the adjustment value with [10KEY] and press [START] key to save the set value and make a copy.
<table>
<tr><th>Mode</th><th>Display item</th><th>Default</th><th>LED</th></tr>
<tr><td>Main cassette paper fed</td><td>TRAY1</td><td>50</td><td>COPY mode lamp
Main cassette lamp</td></tr>
<tr><td>(*) 2nd cassette paper feed</td><td>TRAY2</td><td>50</td><td>COPY mode lamp
2nd cassette lamp</td></tr>
<tr><td>Manual paper feed</td><td>MFT</td><td>50</td><td>COPY mode lamp
Manual feed lamp</td></tr>
<tr><td>(*) RSPF document paper feed (Front surface)</td><td>SIDE1</td><td>50</td><td>COPY mode lamp
PRINT mode lamp
SCAN mode lamp</td></tr>
<tr><td>(*) RSPF document paper feed (Back surface)</td><td>SIDE2</td><td>50</td><td>COPY mode lamp
PRINT mode lamp</td></tr>
<tr><td>(*) Duplex back surface</td><td>DUP-2</td><td>50</td><td>PRINT mode lamp
SCAN mode lamp</td></tr>
</table>
(*): Support for the installation models. For non-installation models, skip.
[Operation]
The operation is similar to test command 46-01.
</td></tr>
<tr><td>53</td><td>08</td><td>SPF scan position automatic adjustment (SPF AUTO) (Disabled when set to OC)</td><td>
[Function]
Place a black chart so that it covers the SPF scan glass and the OC glass together, and close the OC cover.
When this test command is executed, the current adjustment value is displayed as the initial display.
* Default is 1. Adjustment range is 1 – 99. Adjustment unit 1 = about 0.127mm
* If the values are kept as the default values, SPF scan is not performed properly. The front area of the proper scan position may be scanned.
In case of AUTO, press [START] key, and the mirror unit scans from the home position to the SPF scan position with the adjustment value displayed. The SPF glass cover edge position is calculated from the difference between the SPFG glass cover edge and the OC side document glass CCD output level. If the adjustment is normal, the adjusted value is displayed. If abnormal, the error LED lights up with the current set value displayed.
During the error LED is lighted, when [START] key is pressed again, execution is performed again.
<table>
<tr><th>Mode</th><th>Display item</th><th>Default</th><th>LED</th></tr>
<tr><td>SPF scan position auto adjustment</td><td>AUTO</td><td>1</td><td>COPY mode lamp</td></tr>
<tr><td>SPF scan position manual adjustment</td><td>MANU</td><td>1</td><td>PRINT mode lamp</td></tr>
</table>
[Operation]
The operation is similar to test command 46-01. (In MANUAL)
OK/ERR display in AUTO
<When OK>
<pre>
53-08 SPF AUTO
AUTO 100% **   OK
</pre>
<When ERR>
<pre>
53-08 SPF AUTO
AUTO 100% **   ERR
</pre>
</td></tr>
<tr><td>61</td><td>03</td><td>HSYNC output check (LSU CHK)</td><td>
[Function]
When [ENTER/START] key is pressed, HSYNC is performed and the polygon motor is rotated for 30sec.
At that time, the COPY mode lamp is lighted for 100msec every time when HSYNC is detected.
[Operation]
1) Initial display
<pre>
61-03 LSU CHK
EXECUTING...
</pre>
</td></tr>
</table>

Main code	Sub code	Contents	Details of function/operation

63	01	Shading check (SHADING CHK)	**[Function]**
			Used to display the detection level of white plate for shading.
			When [ENTER/START] key is pressed, the mirror base unit moves to the white plate for shading and the copy lamp is lighted.
			When the light quantity is stabilized, revision is made for every second, and the level of one pixel at the center of CCD which is not corrected is detected and the value is displayed in decimal values on the LCD. (3 digits)
			[Operation]
			1) Initial display
			`63-01 SHADING CHK`
			`EXECUTING...     000`

	02	Black level automatic correction (BLACK LEVEL)	**[Function]**
			Used to acquire the black level target value used for the black level adjustment of white balance.
			When this test command is executed, the current correction value is displayed in 3 digits of 12bit hexadecimal number.
			Place the gray gradation chart (UKOG-0162FCZZ) used as the correction document so that the density 10 (black side) comes on the left side and that the chart is upside down at the center of the plate left center.
			
			
			When [ENTER/START] key is pressed, the mirror base unit scans the chart and calculates the correction value.
			After completion of correction, the corrected value is displayed on the LCD.
			* Default: 0
			* If the value is set to the default, operation is made with 0x60.
			[Operation]
			1) Initial display
			`63-02 BLACK LEVEL`
			`                000`
			2) [ENTER/START] Correction start
			`63-02 BLACK LEVEL`
			`EXECUTING...`
			<During canceling - When C/CA is pressed->
			After canceling, the machine goes into the sub code entry standby mode.
			`THE JOB IS BEING`
			`CANCELED.`
			3) After execution
			`63-02 BLACK LEVEL`
			`             *** OK`
			3) In case of an error
			`63-02 BLACK LEVEL`
			`             *** ERR`

<table>
<tr><th>Main code</th><th>Sub code</th><th>Contents</th><th>Details of function/operation</th></tr>
<tr><td>64</td><td>01</td><td>Self print (1by2 mode)
(SELF PRT.)</td><td>[Function]
The status of the optical section is ignored and printing of one page is made. Also when the print command is received from the host, printing is made.
When this test command is executed, warm-up is performed and the ready lamp is lighted. (Since, however, the scanner is disabled, initializing is not made.)
Enter the code number and press [ENTER/START] key to start paper feed from the selected cassette and print in the selected pattern.
<table>
<tr><th>Code number</th><th>Pattern</th><th>Display item</th></tr>
<tr><td>0</td><td>1by2</td><td>1 BY 2</td></tr>
<tr><td>1</td><td>Grid pattern</td><td>CHECK</td></tr>
<tr><td>2</td><td>White paper</td><td>WHITE</td></tr>
<tr><td>3</td><td>Black background</td><td>BLACK</td></tr>
</table>
* For 4 – 99, flip.
[Operation]
The operation is similar to test command 21-01.</td></tr>
<tr><td>66</td><td>01</td><td>FAX soft SW setting
(Executable only when the FAX is installed.)</td><td>[Function]
Use to check the FAX soft SW setting.
Every time when the key is pressed, the bit on the first line is switched 0 and 1.
[Operation]
1) Initial display
ENTER FAX SOFT SW. #
(3 DIGITS)   SW.___
* [CLEAR] key: FAX control is terminated.
2) Enter a 3-digit value of soft SW No. (To enter the fourth digit, shift to the left.), and the press [ENTER] key.
No.###   xxxxxxxx
CHANGE?   1:YES 2:NO
"xxxxxxxx" is the set content.
* Select 2: Returns to the soft SW No. entry display.
3) Select 1
No.###   xxxxxxxx
USE # KEY   12345678
4) Change with 1-8 of [10KEY] and the press [ENTER] key.
No.###   xxxxxxxx
STORED?   1:YES 2:NO
"xxxxxxxx" is the set content.
* Select 2: Returns to the soft SW No. entry display.
5) Select 1
STORED
After 2sec, returns to "1) Initial display".</td></tr>
<tr><td></td><td>02</td><td>FAX soft SW initializing (excluding the adjustment values) (Executable only when the FAX is installed.)</td><td>[Function]
Use to initializing FAX soft SW.
[Operation]
1) Initial display
INITIALIZED
After 2sec, FAX control is terminated.</td></tr>
</table>

Main code	Sub code	Contents	Details of function/operation

66	03	FAX PWB memory check (Executable only when the FAX is installed.)	**[Function]**
			Use to check the FAX PWB memory.
			[Operation]
			1) Initial display
			`SELECT CHECK MEMORY` / `PRESS ←, →`
			2) [←/→] or after 2sec
			Every time when [→] key is pressed, the second line is changed in the sequence of No. 1 → 2 → 3 → 1.
			When [←] key is pressed, the sequence is reversed.
			`SELECT MEMORY (1-3)` / `1:DRAM` ; `SELECT MEMORY (1-3)` / `2:SRAM` ; `SELECT MEMORY (1-3)` / `3:FLASH`
			* [CLEAR] key: FAX control is terminated.
			3) [ENTER] key
			`CHECKING MEMORY`
			4) After completion of check
			• When the result is OK: `MEMORY CHECK RESULT` / `OK`
			• In case of address bus check error: `MEMORY CHECK RESULT` / `XXXXXXXX A-BUS NG`
			• In case of data bus check error: `MEMORY CHECK RESULT` / `XXXXXXXX D-BUS NG`
			• In case of sum check error: `MEMORY CHECK RESULT` / `XXXXXXXX SUM NG`
			• In case of data check error: `MEMORY CHECK RESULT` / `XXXXXXXX DATA NG`
			• In case of erase check error: `MEMORY CHECK RESULT` / `XXXXXXXX ERASE NG`
			* [CLEAR] key: Returns to "1) Initial display".

	04	Signal send mode (Max. value) (Executable only when the FAX is installed.)	**[Function]** Use to set the signal send mode (Max. value). Facsimile test command design specifications. (see table below)

1	NO SIGNAL	13	7200bps(V34)	25	2400bps(V27ter)
2	33600bps(V34)	14	4800bps(V34)	26	300bps(FLAG)
3	31200bps(V34)	15	2400bps(V34)	27	2100Hz(CED)
4	28800bps(V34)	16	14400bps(V33)	28	1100Hz(CNG)
5	26400bps(V34)	17	12000bps(V33)	29	300bps(V21)
6	24000bps(V34)	18	14400bps(V17)	30	2100Hz(ANSam)
7	21600bps(V34)	19	12000bps(V17)	31	DUMMY RING
8	19200bps(V34)	20	9600bps(V17)	32	NO VOICE ANSWER
9	16800bps(V34)	21	7200bps(V17)	33	NO RING BACK TONE
10	14400bps(V34)	22	9600bps(V29)	34	LINE OFF HOOK
11	12000bps(V34)	23	7200bps(V29)	35	LINE ON HOOK
12	9600bps(V34)	24	4800bps(V27ter)		

[Operation]

1) Initial display

```
SELECT OUTPUT SIGNAL
(2 DIGITS)    No.___
```

2) 2-digit (1-35) with [10KEY] / [←/→] / 2sec after

Pressing [→] key or [←] key reverses the sequence.

```
No. (1-35)            No. (1-35)
1:NO SIGNAL   .....   35:LINE ON HOOK
```

* [CLEAR] key: FAX control is terminated.

3) [ENTER] key

Send after setting

```
OUTPUTING SIGNAL MAX
PRESS CLEAR TO STOP
```

* [CLEAR] key: Returns to "1) Initial display".

<table>
<tr><th>Main code</th><th>Sub code</th><th>Contents</th><th>Details of function/operation</th></tr>
<tr><td>66</td><td>05</td><td>Signal send mode (Soft SW set value) (Executable only when the FAX is installed.)</td><td>
[Function]
Use to set the signal send mode (Soft SW set value).
Facsimile test command design specifications.
<table>
<tr><td>1</td><td>NO SIGNAL</td><td>13</td><td>7200bps(V34)</td><td>25</td><td>2400bps(V27ter)</td></tr>
<tr><td>2</td><td>33600bps(V34)</td><td>14</td><td>4800bps(V34)</td><td>26</td><td>300bps(FLAG)</td></tr>
<tr><td>3</td><td>31200bps(V34)</td><td>15</td><td>2400bps(V34)</td><td>27</td><td>2100Hz(CED)</td></tr>
<tr><td>4</td><td>28800bps(V34)</td><td>16</td><td>14400bps(V33)</td><td>28</td><td>1100Hz(CNG)</td></tr>
<tr><td>5</td><td>26400bps(V34)</td><td>17</td><td>12000bps(V33)</td><td>29</td><td>300bps(V21)</td></tr>
<tr><td>6</td><td>24000bps(V34)</td><td>18</td><td>14400bps(V17)</td><td>30</td><td>2100Hz(ANSam)</td></tr>
<tr><td>7</td><td>21600bps(V34)</td><td>19</td><td>12000bps(V17)</td><td>31</td><td>DUMMY RING</td></tr>
<tr><td>8</td><td>19200bps(V34)</td><td>20</td><td>9600bps(V17)</td><td>32</td><td>NO VOICE ANSWER</td></tr>
<tr><td>9</td><td>16800bps(V34)</td><td>21</td><td>7200bps(V17)</td><td>33</td><td>NO RING BACK TONE</td></tr>
<tr><td>10</td><td>14400bps(V34)</td><td>22</td><td>9600bps(V29)</td><td>34</td><td>LINE OFF HOOK</td></tr>
<tr><td>11</td><td>12000bps(V34)</td><td>23</td><td>7200bps(V29)</td><td>35</td><td>LINE ON HOOK</td></tr>
<tr><td>12</td><td>9600bps(V34)</td><td>24</td><td>4800bps(V27ter)</td><td></td><td></td></tr>
</table>
[Operation]
1) Initial display
SELECT OUTPUT SIGNAL
(2 DIGITS) No.___
2) 2-digit (1-35) with [10KEY] / [←/→] / 2sec after
Pressing [→] key or [←] key reverses the sequence.
No. (1-35)
1:NO SIGNAL
.....
No. (1-35)
35:LINE ON HOOK
* [CLEAR] key: FAX control is terminated.
3) [ENTER] key
Send after setting
OUTPUTING SIGNAL SSW
PRESS CLEAR TO STOP
* [CLEAR] key: Returns to "1) Initial display".
</td></tr>
<tr><td></td><td>07</td><td>Image memory content print (Executable only when the FAX is installed.)</td><td>
[Function]
Use to print the image memory content.
[Operation]
• When print is allowed
PRINT STORED
After completion of printing, FAX control is terminated.
• When there is no print data
NO DATA
After 2 sec, FAX control is terminated.
• When print is inhibited
CAN NOT PRINT
After 2 sec, FAX control is terminated.
</td></tr>
<tr><td></td><td>10</td><td>Image memory content clear (Executable only when the FAX is installed.)</td><td>
[Function]
Use to clear the image memory content.
[Operation]
• When there are some print data
CLEAR IMAGE MEMORY
After completion of memory clear, the buzzer sounds.
CLEARED
PLEASE POWER OFF
Remains unchanged until the power is turned off.
• When there are no print data
CLEAR IMAGE MEMORY
After completion of memory clear
CLEARED
After 2sec, FAX control is terminated.
</td></tr>
</table>

Main code	Sub code	Contents	Details of function/operation

66	11	300bps signal send (Max. value) (Executable only when the FAX is installed.)	**[Function]**
			Use to set the 300bps signal send (Max. value).
			1: NO SIGNAL
			2: 11111
			3: 11110
			4: 00000
			5: 010101
			6: 00001
			[Operation]
			1) Initial display
			`SELECT SIGNAL` / `PRESS ←, →`
			2) [←/→] or after 2sec
			Every time when [→] key is pressed, the second line is changed in the sequence of No. 1 → 2 → 3 → 4 → 5 → 6 → 1.
			When [←] key is pressed, the sequence is reversed.
			`SELECT SIGNAL (1-6)` / `1:NO SIGNAL` ..... `SELECT SIGNAL (1-6)` / `6:00001`
			* [CLEAR] key: FAX control is terminated.
			3) [ENTER] key
			`OUTPUTING SIGNAL MAX` / `PRESS CLEAR TO STOP`
			* [CLEAR] key: Returns to "1) Initial display".

	12	300bps signal send (Soft SW set value) (Executable only when the FAX is installed.)	**[Function]**
			Use to set the 300bps signal send (Soft SW set value).
			1: NO SIGNAL
			2: 11111
			3: 11110
			4: 00000
			5: 010101
			6: 00001
			[Operation]
			1) Initial display
			`SELECT SIGNAL` / `PRESS ←, →`
			2) [←/→] or after 2sec
			Every time when [→] key is pressed, the second line is changed in the sequence of No. 1 → 2 → 3 → 4 → 5 → 6 → 1.
			When [←] key is pressed, the sequence is reversed.
			`SELECT SIGNAL (1-6)` / `1:NO SIGNAL` ..... `SELECT SIGNAL (1-6)` / `6:00001`
			* [CLEAR] key: FAX control is terminated.
			3) [ENTER] key
			`OUTPUTING SIGNAL SSW` / `PRESS CLEAR TO STOP`
			* [CLEAR] key: Returns to "1) Initial display".

Main code	Sub code	Contents	Details of function/operation

66	13	Dial test (Executable only when the FAX is installed.)	**[Function]**
			Use to the dial test.
			[Operation]
			■ **Dial test (PULSE)**
			1) Initial display
			`SELECT SIGNAL`
			`1:PULSE    2:DTMF`
			* [CLEAR] key: FAX control is terminated.
			2) Select 1
			`INPUT MAKE TIME`
			`(0-15)            __`
			3) Enter the make time in 2 digits.
			`INPUT DIAL #`
			`XXXX`
			XXXX: Default
			* After deleting with [CLEAR] key, input can be made.
			4) [ENTER] key
			`SEND yyPPS xxms`
			`1:YES 2:NO`
			"yy" is the selected pulse 10 or 20.
			"xx" is the input value.
			* Select 2: Returns to “2)” display.
			5) Select 1
			Switched to 10/20PPS set with pulse selection inside.
			6) After setting
			`SENDING yyPPS xxms`
			7) After completion of sending
			`TERMINATE ?`
			`1:YES 2:NO`
			* Select 2: Returns to “4)” display.
			8) Select 1
			`TERMINATED`
			After 2sec, returns to "1) Initial display".
			■ **Dial test (DTMF)**
			1) Initial display
			`SELECT SIGNAL`
			`1:PULSE    2:DTMF`
			* [CLEAR] key: FAX control is terminated.
			2) Select 2
			`SELECT HIGH LEVEL`
			`1:DEFAULT 2:SOFT SW.`
			↓ Select 2
			`INPUT VALUE`
			`(0-15)            __`
			↓
			3) Select 1
			`SELECT LOW LEVEL`
			`1:DEFAULT 2:SOFT SW.`
			↓ Select 2
			`INPUT VALUE`
			`(0-15)            __`
			↓
			4) Select 1
			`INPUT DIAL #`
			`XXXX`
			XXXX: Default
			* After deleting with [CLEAR] key, input can be made.
			4) [ENTER] key
			`H:xx        L:yy`
			`1:YES 2:NO`
			"xx" indicates HI, and "yy" indicates Low Soft SW.
			* Select 2: Returns to “4)” display.
			5) Select 1
			HI/LO is selected with the signal level inside.
			6) After setting the signal send level
			`SENDING DTMF`
			7) After completion of sending
			`TERMINATE ?`
			`1:YES 2:NO`
			* Select 2: Returns to “4)” display.
			8) Select 1
			`TERMINATED`
			After 2sec, returns to "1) Initial display".

	17	DTMF signal send (Max. value) (Executable only when the FAX is installed.)	**[Function]**
			Use to set the DTMF signal send (Max. value).
			[Operation]
			1) Initial display
			`INPUT DIAL #`
			* [CLEAR] key: FAX control is terminated.
			2) [10KEY] input
			The content selected with signal send level selection is set inside.
			3) Communication is started after setting the signal send level.
			`SENDING SIGNAL MAX`
			`PRESS CLEAR TO STOP`
			* [CLEAR] key: Returns to "1) Initial display".

Main code	Sub code	Contents	Details of function/operation

66	18	DTMF signal send (Soft SW set value) (Executable only when the FAX is installed.)	**[Function]**
			Use to set the DTMF signal send (Soft SW set value).
			[Operation]
			1) Initial display
			`INPUT DIAL #`
			* [CLEAR] key: FAX control is terminated.
			2) [10KEY] input
			The content selected with signal send level selection is set inside.
			3) Communication is started after setting the signal send level.
			`SENDING SIGNAL SSW`
			`PRESS CLEAR TO STOP`
			* [CLEAR] key: Returns to "1) Initial display".

	21	FAX information print (Executable only when the FAX is installed.)	**[Function]**
			Use to print the FAX information.
			[Operation]
			1) Initial display
			`SELECT REPORT (1-3)`
			`PRESS ←, →`
			2) [←/→] or after 2sec
			Every time when [→] key is pressed, the second line is changed in the sequence of 1 → 2 → 3 → 1.
			When [←] key is pressed, the sequence is reversed.
			`SELECT REPORT (1-3)` `1:USER SW. LIST`
			`SELECT REPORT (1-3)` `2:SOFT SW. LIST`
			`SELECT REPORT (1-3)` `3:PROTOCOL`
			* [CLEAR] key: FAX control is terminated.
			3) [ENTER] key
			• When print is allowed
			`PRINT STORED`
			After completion of printing, FAX control is terminated.
			• When print is inhibited
			`CAN NOT PRINT`
			After 2sec, FAX control is terminated.

	24	FAST SRAM clear (Executable only when the FAX is installed.)	**[Function]**
			Use to clear the FAST SRAM.
			[Operation]
			1) Initial display
			`CLEAR FAST SRAM`
			2) After completion of clearing
			`CLEARED`
			After 2sec, FAX control is terminated.

	30	TEL/LIU status change check (Executable only when the FAX is installed.)	**[Function]**
			Use to check the TEL/LIU status change.
			[Operation]
			1) Initial display
			`HS2 :xxx HS1 :xxx`
			`RHS :xxx EXHS:xxx`
			↑
			The display is switched every 2sec.
			↓
			`CHECKING`
			`PRESS CLEAR TO STOP`
			* [CLEAR] key: FAX control is terminated.

Main code	Sub code	Contents	Details of function/operation

66	32	Receive data check (Executable only when the FAX is installed.)	**[Function]**
			Use to check the receive data.
			[Operation]
			1) Initial display
			`RECEIVING`
			2) After completion of reception
			`RESULT` / `xx`
			"xx" is "OK" or "NG" depending on the check result.
			* [CLEAR] key: FAX control is terminated.

	33	Signal detection check (Executable only when the FAX is installed.)	**[Function]** Use to check the signal detection. **[Operation]** 1) Initial display `CHECKING NONE` / `PRESS CLEAR TO STOP` When a signal is detected, the display is changed from NONE to the following. CI/CNG/CED/BT/DT/Flag/SDT/DTMF * [CLEAR] key: FAX control is terminated.
	34	Communication time measurement (Executable only when the FAX is installed.)	**[Function]** Use to measurement the communication time. **[Operation]** 1) Initial display `COMM. TIME` / `xx:xx:xx:xxx msec` "xx:xx:xx:xxx" indicates o'clock, minute, second, millisecond. * [CLEAR] key: FAX control is terminated.

	37	Speaker sound volume setting (Executable only when the FAX is installed.)	**[Function]**
			Use to set the speaker sound volume.
			1: NO SOUND
			2: LOW
			3: MID
			4: HIGH
			[Operation]
			1) Initial display
			`SELECT SPEEKER VOL.` / `PRESS ←, →`
			2) [←/→] or after 2sec
			Every time when [→] key is pressed, the second line is changed in the sequence of 1 → 2 → 3 → 4 → 1.
			When [←] key is pressed, the sequence is reversed.
			`SELECT (1-4)` / `1:NO SOUND` `SELECT (1-4)` / `2:LOW` .....
			* [CLEAR] key: FAX control is terminated.
			3) [ENTER] key
			`STORED` / `xxx`
			xxx: Set content
			After 2sec, FAX control is terminated.

Main code	Sub code	Contents	Details of function/operation

66	38	Time setting/check (Executable only when the FAX is installed.)	**[Function]**
			Use to check the time setting.
			[Operation]
			1) Initial display
			`SELECT TO SET`
			`1:DATE 2:TIME`
			∗ [CLEAR] key: FAX control is terminated.
			2) Select 1
			`xxxx.xx.xx(xxx)`
			`CHANGE? 1:YES 2:NO`
			"xxxx.xx.xx(xxx)" is the current value. (No revision of display)
			3) Select 1
			`INPUT YEAR`
			`(4 DIGITS)____.__.__`
			∗ Select 2: Returns to "1) Initial display".
			4) Enter the year in 4 digits.
			`INPUT MONTH`
			`(1-12) 1998.__.__`
			5) Enter the month in 2 digits.
			`INPUT DAY`
			`(1-31) 1998.01.__`
			6) Enter the day in 2 digits.
			`xxxx.xx.xx(xxx)`
			`STORED? 1:YES 2:NO`
			"xxxx.xx.xx(xxx) is the entered value.
			∗ Select 2: Returns to "1) Initial display".
			7) Select 1
			`STORED`
			After 2sec, returns to "1) Initial display".
			
			2) Select 2
			`xx:xx`
			`CHANGE? 1:YES 2:NO`
			"xx:xx" is the current value.
			3) Select 1
			`INPUT HOUR`
			`(0-24) __:__`
			∗ Select 2: Returns to "1) Initial display".
			4) Enter o'clock in 2 digits.
			`INPUT MINUTE`
			`(00-59) 01:__`
			5) Enter minute in 2 digits.
			`xx:xx`
			`STORED? 1:YES 2:NO`
			"xx:xx" is the current value.
			∗ Select 2: Returns to "1) Initial display".
			6) Select 1
			`STORED`
			After 2sec, returns to "1) Initial display".

	41	CI signal check (Executable only when the FAX is installed.)	**[Function]**
			Use to check the CI signal.
			When CI signal is detected, OFF → ON.
			[Operation]
			1) Initial display
			`CHECKING CI:OFF`
			`PRESS CLEAR TO STOP`
			∗ [CLEAR] key: FAX control is terminated.

5. Trouble codes

A. Trouble codes list

Main code	Sub code	Details of trouble
E1	00	IMC communication trouble
	10	IMC trouble
	13	IMC flash ROM error
	16	IMC DIMM memory read/write check error
	81	IMC communication interface error (parity)
	82	IMC communication interface error (Overrun)
	84	IMC communication interface error (Framing)
E7	02	LSU trouble
	10	Shading trouble (Black correction)
	11	Shading trouble (White correction)
	16	Abnormal laser output
F2	04	Improper cartridge (Destination error, life cycle error)
F5	02	Copy lamp lighting abnormality
F6	10	FAX board trouble
H2	00	Thermistor open
H3	00	Heat roller high temperature detection
H4	00	Heat roller low temperature detection
L1	00	Feeding is not completed within the specified time after starting feeding. (The scan head locking switch is locked)
L3	00	Scanner return trouble
L4	01	Main motor lock detection
L6	10	Polygon motor lock detection
U1	03	FAX board battery error
U2	04	EEPROM read/write error (Serial communication error)
	11	Counter check sum error (EEPROM)
	40	CRUM chip communication error
U9	99	Operation panel language error

B. Details of trouble codes

Main code	Sub code	Details of trouble	
E1	00	Content	IMC communication trouble
		Detail	An abnormality occurs in communication between the CPU and the IMC.
		Cause	IMC – CPU signal line abnormality IMC Memory defect/data abnormality
		Check and remedy	Replace the MCU PWB with new one.
	10	Content	IMC trouble
		Detail	An abnormality occurs in the IMC.
		Cause	USB chip error/CODEC error on the IMC.
		Check and remedy	Replace the MCU PWB with a new one.
	13	Content	IMC flash ROM error
		Detail	An abnormality occurs in the IMC flash ROM.
		Cause	IMC abnormality
		Check and remedy	Replace the MCU PWB with a new one. If downloading of the program is abnormally terminated, it may cause an error. Download the program again to avoid this.
	16	Content	IMC DIMM memory read/write check error
		Detail	An installation error occurs in the IMC memory module. An error occurs during access to the IMC memory.
		Cause	Improper installation of the IMC memory module. IMC memory module abnormality IMC memory contact abnormality IMC abnormality.
		Check and remedy	Check installation of the memory module. Replace the memory module. Replace the MCU PWB with a new one.
	81	Content	IMC communication interface error (parity)
		Detail	A parity error occurs in communication between the CPU and the IMC.
		Cause	IMC memory defect/data abnormality
		Check and remedy	Check the memory of the IMC. Replace the MCU PWB with new one.
	82	Content	IMC communication interface error (Overrun)
		Detail	An overrun error occurs in communication between the CPU and the IMC.
		Cause	IMC memory defect/data abnormality.
		Check and remedy	Check the memory of the IMC. Replace the MCU PWB with new one.
	84	Content	IMC communication interface error (Framing)
		Detail	A framing error occurs in communication between the CPU and the IMC.
		Cause	IMC memory defect/data abnormality.
		Check and remedy	Check the memory of the IMC.
E7	02	Content	LSU trouble
		Detail	The BD signal from the LSU cannot be detected in a certain cycle. (Always OFF or always ON)
		Cause	LSU connector or LSU harness defect or disconnection Polygon motor rotation abnormality Laser beams are not generated. MCU PWB abnormality.
		Check and remedy	Check connection of the LSU connector. Execute TC 61-03 to check the LSU operations. Check that the polygon motor rotates normally. Check that the laser emitting diode generates laser beams. Replace the LSU unit. Replace the MCU PWB.
	10	Content	Shading trouble (Black correction)
		Detail	The CCD black scan level is abnormal when the shading.
		Cause	Improper connection of the CCD unit flat cable CCD unit abnormality MCU PWB abnormality
		Check and remedy	Check connection of the CCD unit flat cable. Check the CCD unit.

Main code	Sub code	Details of trouble	
E7	11	Content	Shading trouble (White correction)
		Detail	The CCD white scan level is abnormal when the shading.
		Cause	Improper connection of the CCD unit flat cable Dirt on the mirror, the lens, and the reference white plate Copy lamp lighting abnormality CCD unit abnormality MCU PWB abnormality (When occurred in the SPF scan position.) Improper installation of the mirror unit
		Check and remedy	Clean the mirror, lens, and the reference white plate. Check the light quantity and lighting status of the copy lamp (TC 05-03). Check the MCU PWB.
	16	Content	Abnormal laser output
		Detail	When the laser output is stopped, HSYNC is detected.
		Cause	Laser abnormality MCU PWB abnormality.
		Check and remedy	Check the laser emitting diode operation. Replace the MCU PWB.
F2	04	Content	Improper cartridge (Destination error, life cycle error)
		Detail	The destination of the main unit differs from that of the CRUM. The life cycle information is other than "FFh" (Not used).
		Cause	CRUM chip trouble Improper developing unit
		Check and remedy	Replace the CRUM chip. Replace the developing unit.
F5	02	Content	Copy lamp lighting abnormality
		Detail	The copy lamp does not turn on.
		Cause	Copy lamp abnormality Copy lamp harness abnormality CCD PWB harness abnormality.
		Check and remedy	Use TC 5-3 to check the copy lamp operations. **When the copy lamp lights up.** Check the harness and the connector between the CCD unit and the MCU PWB. **When the copy lamp does not light up.** Check the harness and the connector between the copy lamp unit and the MCU PWB. Replace the copy lamp unit. Replace the MCU PWB.
F6	10	Content	FAX board trouble
		Detail	Communication trouble between MCU and FAX control PWB
		Cause	FAX control PWB connector disconnection Defective harness between FAX control PWB and MCU PWB Motherboard connector pin breakage FAX control PWB ROM error/Data error IC on FAX PWB causes abnormality
		Check and remedy	Check connector/harness of FAX control PWB and MCU PWB. Check the grounding of the copier. Check FAX control PWB ROM. Replace the FAX PWB.

Main code	Sub code	Details of trouble	
H2	00	Content	Thermistor open
		Detail	The thermistor is open. The fusing unit is not installed.
		Cause	Thermistor abnormality Control PWB abnormality Fusing section connector disconnection The fusing unit is not installed.
		Check and remedy	Check the harness and the connector between the thermistor and the PWB. Use TC 14 to clear the self diagnostic display.
H3	00	Content	Heat roller high temperature detection
		Detail	The fusing temperature exceeds 240°C.
		Cause	Thermistor abnormality Control PWB abnormality Fusing section connector disconnection.
		Check and remedy	Use TC 5-02 to check the heater lamp blinking operation. **When the lamp blinks normally.** Check the thermistor and its harness. Check the thermistor input circuit on the control PWB. **When the lamp keeps ON.** Check the power PWB and the lamp control circuit on the MCU PWB. Use TC 14 to clear the self diagnostic display.
H4	00	Content	Heat roller low temperature detection
		Detail	The fusing temperature does not reach 185°C within 27 sec of turning on the power, or the fusing temperature keeps at 140°C.
		Cause	Thermistor abnormality Heater lamp abnormality Thermostat abnormality Control PWB abnormality
		Check and remedy	Use TC 5-02 to check the heater lamp blinking operation. **When the lamp blinks normally.** Check the thermistor and its harness. Check the thermistor input circuit on the control PWB. **When the lamp does not light up.** Check for disconnection of the heater lamp and the thermostat. Check the interlock switch. Check the power PWB and the lamp control circuit on the MCU PWB. Use TC 14 to clear the self diagnostic display.

Main code	Sub code	Details of trouble	
L1	00	Content	Feeding is not completed within the specified time after starting feeding. (The scan head locking switch is locked)
		Detail	The white area and the black marking on the shading plate are used to obtain the difference in the CCD level values for judgment of lock. When the difference in the levels of which and black is small, it is judged that the black mark could not be scanned by lock and the trouble code "L1" is displayed.
		Cause	The scan head is locked by the lock switch. Mirror unit abnormality The scanner wire is disconnected. The origin detection sensor abnormality Mirror motor harness abnormality
		Check and remedy	Check to confirm that the scan head lock switch is released. Use TC 1-1 to check the mirror reciprocating operations. **When the mirror does not feed.** Check for disconnection of the scanner wire. Check the harness and the connector between the mirror motor and the MCU PWB. Replace the mirror unit. Replace the MCU PWB. **When the mirror does feed.** Use TC 1-2 to check the mirror home position sensor.
L3	00	Content	Scanner return trouble
		Detail	When the mirror base is returned for the specified time (6 sec) in mirror initializing after turning on the power, the mirror home position sensor (MHPS) does not turn ON. Or when the mirror base is returned for the specified time (about 6 sec) after start of copy return, the mirror home position sensor (MHPS) does not turn ON.
		Cause	Mirror unit abnormality Scanner wire disconnection Origin detection sensor abnormality Mirror motor harness abnormality
		Check and remedy	Use TC 1-1 to check the mirror reciprocating operations. **When the mirror does not return.** Check for disconnection of the scanner wire. Check the harness and the connector between the mirror motor and the MCU PWB. Replace the mirror unit. Replace the MCU PWB. **When the mirror does feed.** Use TC 1-2 to check the mirror home position sensor.
L4	01	Content	Main motor lock detection
		Detail	When the main motor encoder pulse is not detected for 100 msec.
		Cause	Main motor unit abnormality Improper connection or disconnection the main motor and the harness. MCU PWB abnormality
		Check and remedy	Use TC 25-01 to check the main motor operations. Check connection of the main motor harness/ connector. Replace the main motor. Replace the MCU PWB.

Main code	Sub code	Details of trouble	
L6	10	Content	Polygon motor lock detection
		Detail	The lock signal (specified rpm signal) does not return within a certain time (about 20 sec) from starting the polygon motor rotation.
		Cause	Polygon motor unit abnormality Improper connection or disconnection of the polygon motor and the harness. MCU PWB abnormality
		Check and remedy	Use TC 61-1 to check the polygon motor operations. Check connection of the polygon motor harness/connector. Replace the polygon motor. Replace the MCU PWB.
U1	03	Content	FAX board battery error
		Details	The SRAM backup battery voltage on FAX PWB falls.
		Cause	The SRAM backup battery voltage on FAX PWB falls.
		Check and remedy	Check voltage of the SRAM back up battery. Replace the battery.
U2	04	Content	EEPROM read/write error (Serial communication error)
		Detail	EEPROM access process error
		Cause	EEPROM abnormality
		Check and remedy	Check that the EEPROM is properly set. Use TC 16 to cancel the trouble. Replace the MCU PWB.
	11	Content	Counter check sum error (EEPROM)
		Detail	Check sum error of the counter area in the EEPROM
		Cause	EEPROM abnormality
		Check and remedy	Check that the EEPROM is properly set. Use TC 16 to cancel the trouble. Replace the MCU PWB.
	40	Content	CRUM chip communication error
		Detail	An error occurs in MCU-CRUM chip communication.
		Cause	CRUM chip trouble Defective contact of developing unit MCU PWB trouble
		Check and remedy	Replace the CRUM chip. Check installation of the developing unit. Cancel the operation with TC16. Replace the MCU PWB.
U9	99	Content	Operation panel language error
		Detail	There is no language file. The language file is destroyed.
		Cause	Language file abnormality MCU PWB abnormality
		Check and remedy	MCU firmware download Replace the MCU PWB.

[11] MAINTENANCE

1. Maintenance table

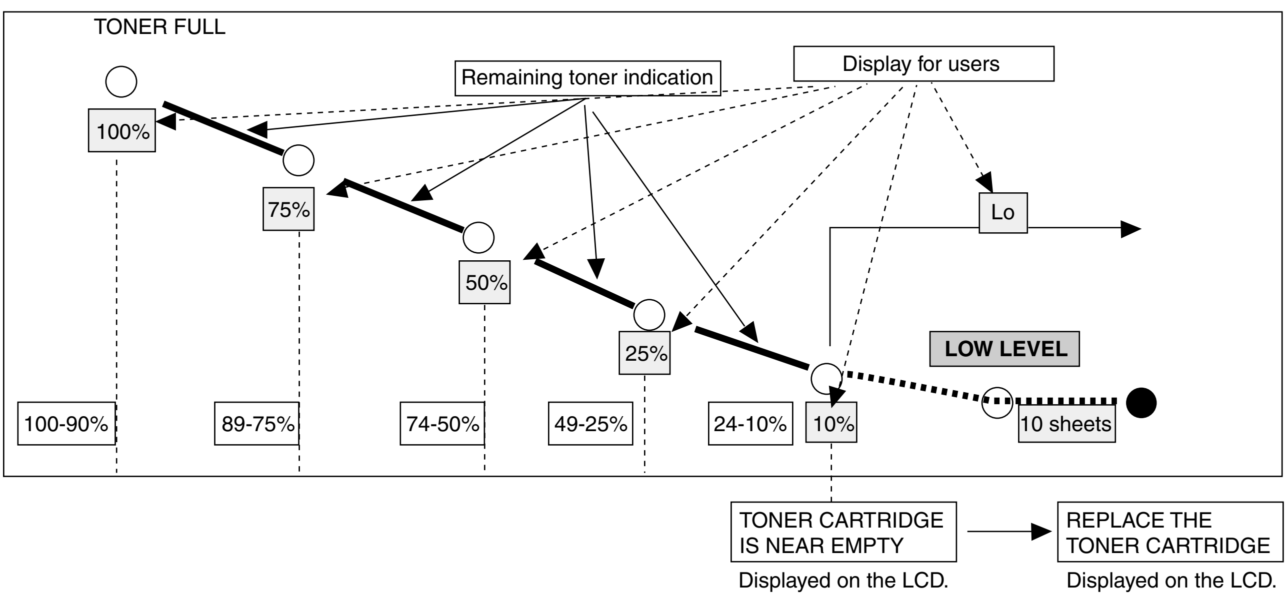
× : Check (Clean, adjust, or replace when required.) ○ : Clean ▲ : Replace △ : Adjust ☆: Lubricate

Section	Parts	25K	50K	75K	100K	125K	Remark
Developing	Developer	▲	▲	▲	▲	▲	
	DV blade	○	▲	○	▲	○	
	DV side seal (F/R)	○	▲	○	▲	○	
Process peripheral	Drum	▲	▲	▲	▲	▲	

2. Maintenance display system

Toner	Life	8K	
	Remaining quantity	NEAR EMPTY About 10%	EMPTY
	LED	ON	Flash
	Machine	Operation allowed	Stop
Developer	Life	25K	
	LED	ON at 25K of the developer count.	
	Machine	Selection is available between Not Stop and Stop by Service Simulation (SIM 26-37) Setup. (If Stop is selected, the LED will flash and stop at 25K.) * Default: Not Stop * Clear: SIM 24-06	
Maintenance	LED	Selection is available among 25K, 13K, 9K, 6K, 3K, and free (no lighting) with SIM 21-1. * Default: 25K * Clear: SIM 20-1	
	Machine	Not stop.	

3. Remaining toner indication



- The remaining toner indication is based on the number of revolutions of the toner motor.
- The toner END indication appears when the END is detected by the toner sensor.

[12] USER PROGRAM

The user settings consist of the following items.

1. User programs

A. Copy mode

Program number	Program name	Setting codes (factory default setting appears in bold)	Explanation
1	AUTO CLEAR	1: 10 SEC. 2: 30 SEC. **3: 60 SEC.** 4: 90 SEC. 5: 120 SEC. 6: OFF	• Auto clear time automatically returns the copy settings to the initial settings if no keys are pressed for a preset period of time following the end of a copy job. • This program is used to select the period of time. Auto clear time can also be disabled.
2	PREHEAT MODE	**1: 30 SEC.** 2: 1 MIN. 3: 5 MIN. 4: 30 MIN. 5: 60 MIN. 6: 120 MIN. 7: 240 MIN.	• This function automatically switches the machine to a low power consumption state if the set duration of time elapses without the machine being used when the power is on. The power save indicator lights up, however, the keys on the operation panel can be used. Normal operation automatically resumes when a key on the operation panel is pressed, an original is placed, a print job is received.
3	AUTO SHUT-OFF	**1: ON** 2: OFF	• Use this setting to enable or disable auto power shut-off mode.
4	AUTO SHUT-OFF TIME	**1: 5 MIN.** 2: 30 MIN. 3: 60 MIN. 4: 120 MIN. 5: 240 MIN.	• This function automatically switches the machine to a state that consumes even less power than preheat mode if the set duration of time elapses without the machine being used when the power is on. All lights except the power save indicator go off. To resume normal operation, press the [START] key. Normal operation also resumes automatically when a print job is received or scanning is begun from a computer. While in auto power shut-off mode, no keys (except the [START] key) can be used.
5	STREAM FEEDING	**1: ON** 2: OFF	• When copying using the RSPF, while "SET ORIGINALS FOR STREAM FEEDING." appears in the display after an original has been scanned (about 5 seconds), a subsequent original can be placed and automatically fed into the machine.
6	LAYOUT IN 2IN1	**1: PATTERN 1** 2: PATTERN 2	• Use this setting to select the layout pattern when two original pages are copied onto a single sheet of paper.
7	OFFSET FUNCTION	**1: ON** 2: OFF	• When enabled, this function offsets the position in the paper output tray of sets of copies during copy job, and print jobs when using the printer function.
8	ROTATE ORIG. IMAGE	1: ON **2: OFF**	• When two-sided copying is performed, this function rotates the image on the back of the original. This is convenient when binding the copies at the top (tablet binding).
9	AE/TEXT RESOLUTION	**1: 300dpi** 2: 600dpi	• This setting is used to change the copy resolution in AUTO and TEXT mode from 600 x 300 dpi to 600 x 600 dpi (high-quality mode). Scanning is slower when high-quality mode is used.
10	2-SIDED COPY MODE (AR-168L only)	**1: HI-SPEED** 2: NORMAL	• If the memory fills up when two-sided copying is performed, "NORMAL" can be selected to make copying possible. However, "NORMAL" results in a slower copying speed. Normally "HI-SPEED" is selected to enable fast two-sided copying.
11	MARGIN WIDTH	1: 1/4" **2: 1/2"** 3: 3/4" 4: 1"	• Use this setting to set the margin width.
12	MEM. FOR PRINTER	1: 30% 2: 40% **3: 50%** 4: 60% 5: 70%	• Use this to change the proportion of machine memory used for printer mode.
13	AUTO KEY REPEAT	**1: ON** 2: OFF	• Use this setting to select whether or not holding down a key causes repeated input of the key. For keys that normally cause a set value to increase when held down (for example, holding down the [<] key [v] or [>] key [^]), this program can be used to have the set value not change when the key is held down.
14	KEY PRESS TIME	**1: NORMAL** 2: 0.5 SEC. 3: 1.0 SEC. 4: 1.5 SEC. 5: 2.0 SEC.	• Use this setting to select how long a key must be pressed for the input to be accepted. By selecting a longer time, you can prevent settings from being changed by the accidental pressing of a key.

Program number	Program name	Setting codes (factory default setting appears in bold)	Explanation
15	KEY TOUCH SOUND	**1: LOW** 2: HIGH 3: OFF	• This sets the volume of beep signals.
16	SOUND AT DEFAULT	1: ON **2: OFF**	• Use this to sound a beep when a base setting is selected.
17	TONER SAVE MODE	1: ON **2: OFF**	• This mode reduces toner usage by about 10% when copying. Toner save mode is effective when the exposure mode is AUTO or TEXT.
18	AE LEVEL ADJUST	1: RSPF 2: DOCUMENT GLASS	• This is used to adjust the exposure level. • The automatic exposure level can be adjusted separately for the document glass and the RSPF. • The factory default setting for the exposure level is "center".
19	LANGUAGE	**1: AMERICAN ENGLISH** 2: FRENCH 3: SPANISH : :	This is used to set the language used in the display.
20	RESET FACTORY	1: Yes **2: No**	This is used to return all settings to the factory default settings.
21	SORT AUTO SELECT	**1: ON** 2: OFF	Use this setting to enable or disable sort auto select mode.

B. Print mode

Program number	Program name	Setting codes (factory default setting appears in bold)	Explanation
1	FORCED OUTPUT	1: ON **2: OFF**	When this function is enabled, printing in printer mode will automatically continue using a different size of paper if the specified size of paper runs out in all trays. This feature does not function in copy mode.
2	USB 2.0 MODE SWITCH *1	**1: FULL-SPEED** 2: HI-SPEED	This sets the USB 2.0 data transfer speed. To obtain the fastest speed when using the USB 2.0 connector, first verify that your computer meets the system requirements (operating system and driver), and then use this program to change the USB 2.0 mode to "Hi-Speed". Note that the setting should not be changed while running a TWAIN driver. (For the system requirements.)
3	AUTO TRAY SWITCH*2	**1: ON** 2: OFF	If the paper runs out during printing and there is paper of the same size in another tray, this function automatically switches to that tray (excluding the bypass tray). The function can be disabled.

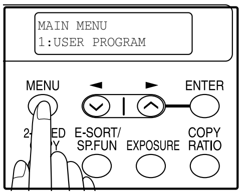
*1: The scanning speed increases when the USB 2.0 mode is set to "HI-SPEED", however, the printing speed does not increase considerably.

*2: When the 250-sheet paper feed unit is installed.

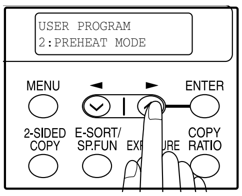
2. Selecting a setting for a user program

1) Press the [MENU] key and then press the [ENTER] key.

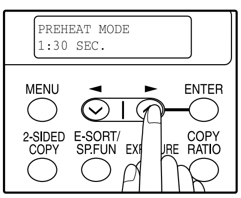
   In printer mode, the user programs are accessed by simply pressing the [MENU] key.



2) Press the [<] key [v] or [>] key [^] to select the item that you wish to configure in the USER PROGRAM items, and then press the [ENTER] key.
   - You can also select a program by directly entering the program number with the numeric keys.



3) Press the [<] key [v] or [>] key [^] to change the setting of the selected item.



NOTE:

- If you mistakenly select the wrong item, press the [CLEAR] key [C] and repeat the procedure from step 2).
- To cancel a setting for a user program, press the [MENU] key.

4) Press the [ENTER] key.

   Your selection appears briefly and then the previous screen appears.

NOTE:

When "AE LEVEL ADJUST" is selected in the user programs and the [ENTER] key is pressed, the automatic exposure adjustment screen appears. Adjust the exposure and press the [ENTER] key.

Audible signals (key entry beep, invalid key beep, base setting beep)

The machine sounds three different types of beep signals: a key entry beep that sounds when a valid key is pressed, an invalid key beep that sounds when an invalid key is pressed, and a base setting beep that sounds when a setting is the same as the base setting (base settings are explained below). The base setting beep is initially disabled. If you wish to enable the base setting beep, see "SOUND AT DEFAULT". If you wish to change the volume of the beep signals or disable them, see "KEY TOUCH SOUND".

The beep patterns of each type of beep signal are as follows:

Key entry beep: One beep
Invalid key beep: Two beeps
Base setting beep: Three beeps

Base settings

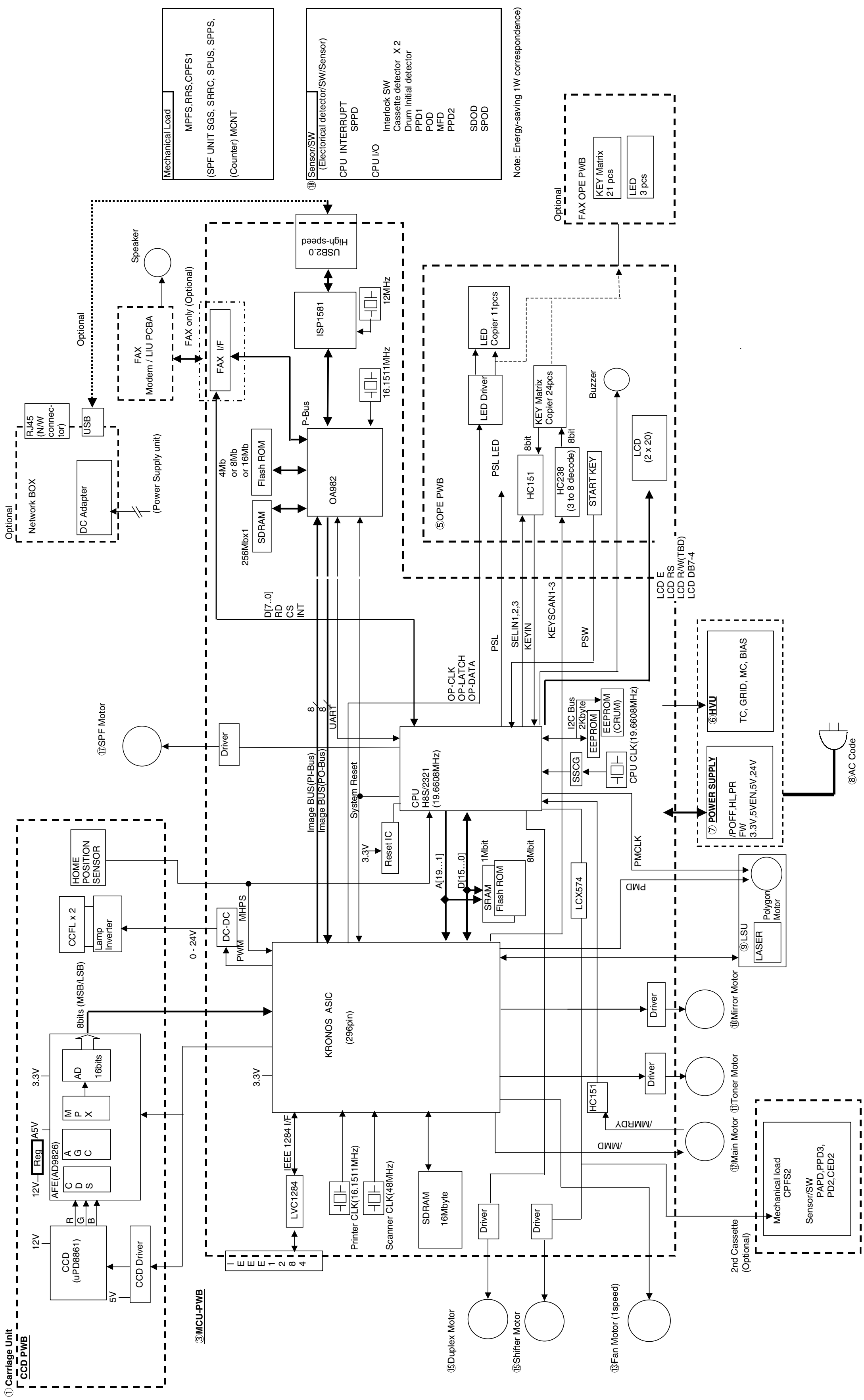
The base settings are preset standard selections for each copy setting. The base settings are as follows:

Copy ratio: 100%
Light and Dark level: center
Paper feed location: Tray 1 (Upper paper tray)
AUTO/TEXT/PHOTO: AUTO

[13] ELECTRICAL SECTION

1. Block diagram

A. Overall block diagram



2. Circuit descriptions

A. Main PWB (MCU)

(1) General

The MCU PWB is composed of:

- CPU peripheral section which performs mechanical sequence control, U/I, and each function job management.
  The CPU connects with the ASIC and memory by use of the system bus and performs jog management and sequence control of the whole engine.
- Image process ASIC which performs image process, CCD control, LSU control, and print control.
- OA982 peripheral section which performs E-Sort and FAX control.
  The OA982 performs image data input/output with the ASIC, SDRAM memory management, and communication with USB2.0 devices.
- I/F section for USB2.0 and IEEE1284 control. (For the AL series, IEEE1284 is not available.)
- Motor control circuit
- Mechanical load, sensor I/O circuit

It performs control and management of the process, the transport loads, the fusing, the optical, and the operation panel sections for executing a series of copy/print/scan operations.

(2) CPU signal table (H8S/2321)

PIN No.	Signal code	Input/ Output	Operating
1	/CS1	Output	SRAM chip select
2	/CS0	Output	Flash ROM chip select
3	GND		DGND
4	GND		DGND
5	Vcc		CPU3.3V
6	A0	Output	Address bus
7	A1	Output	Address bus
8	A2	Output	Address bus
9	A3	Output	Address bus
10	GND		DGND
11	A4	Output	Address bus
12	A5	Output	Address bus
13	A6	Output	Address bus
14	A7	Output	Address bus
15	A8	Output	Address bus
16	A9	Output	Address bus
17	A10	Output	Address bus
18	A11	Output	Address bus
19	GND		DGND
20	A12	Output	Address bus
21	A13	Output	Address bus
22	A14	Output	Address bus
23	A15	Output	Address bus
24	A16	Output	Address bus
25	A17	Output	Address bus
26	A18	Output	Address bus
27	A19	Output	Address bus
28	GND		DGND
29	A20		Pull-Up
30	PSW	Interruption level input	Print SW
31	SPPD	Interruption level input	SPF paper sensor
32	CCD_TG	Interruption level input	CCD horizontal sync signal
33	MHPS	Interruption level input	Mirror Home Position
34	/CPUSYNC	Interruption level input	Horizontal sync (ASIC)
35	GND		DGND
36	GND		DGND
37	FW	Interruption level input	Zero cross signal
38	ARB_INT	Interruption level input	ASIC interruption
39	Vcc		CPU3.3V
40	D0	Data I/O	Data bus
41	D1	Data I/O	Data bus
42	D2	Data I/O	Data bus
43	D3	Data I/O	Data bus
44	GND		DGND
45	D4	Data I/O	Data bus
46	D5	Data I/O	Data bus
47	D6	Data I/O	Data bus
48	D7	Data I/O	Data bus
49	D8	Data I/O	Data bus
50	D9	Data I/O	Data bus
51	D10	Data I/O	Data bus
52	D11	Data I/O	Data bus
53	GND		DGND
54	D12	Data I/O	Data bus
55	D13	Data I/O	Data bus
56	D14	Data I/O	Data bus
57	D15	Data I/O	Data bus
58	Vcc		CPU3.3V
59	POFF	Output	Shut off control
60	TxD1	Output	For debug
61	SDA	Output	EEPROM Data bus
62	SCL	Output	EEPROM clock
63	LCDRS	Output	LCD control
64	LCDE	Output	LCD control
65	GND		DGND
66	CS4 (FAX)		Chip select (FAX)
67	GND		DGND
68	GND		DGND
69	RY/BY	Input	Flash Busy signal
70	LCDDB4	Output	LCD control
71	LCDDB5	Output	LCD control
72	BZR	Output	Buzzer signal
73	LCDDB7	Output	LCD control
74	LCDDB6	Output	LCD control
75	Reset OUT1	Output	Reset signal
76	DMT0	Output	Duplex Motor signal
77	DMT1	Output	Duplex Motor signal
78	DMT2	Output	Duplex Motor signal
79	DMT3	Output	Duplex Motor signal
80	WDTOVF	Output	NC Pull-Up
81	/RES	Input	Reset
82	NMI	Output	NC Pull-Up
83	STBY	Output	NC Pull-Up
84	Vcc		CPU3.3V
85	XTAL	Input	Clock
86	EXTAL	Output	Clock
87	GND		DGND
88	CPUCLK	Output	NC
89	Vcc		CPU3.3V
90	PRINTST	Output	Print start signal
91	/RD	Output	Read signal
92	/HWR	Output	Write signal (High address)
93	/LWR	Output	Write signal (Low address)
94	SELIN3	Output	HC151 select signal
95	SELIN2	Output	HC151 select signal
96	SELIN1	Output	HC151 select signal
97	ESSTS	Output	E-sort control
98	ESCMD	Input	E-sort control
99	GND		DGND
100	GND		DGND
101	ESSRDY	Input	E-sort control
102	ESCRDY	Output	E-sort control
103	AVcc		CPU3.3V
104	Vref		CPU3.3V
105	RTH	Analog input	Fusing thermistor

PIN No.	Signal code	Input/ Output	Operating
106	ESPAGE	Input	E-sort control
107	SIN1	Input	HC151 select detection
108	SIN2	Input	HC151 select detection
109	SIN3	Input	HC151 select detection
110			Pull up
111	KEY IN	Input	NC
112	MSUST1	Input	NC
113	Avss		DGND
114	GND		DGND
115	/SCANSP	Output	Scan STOP signal
116	/SCANST	Output	Scan START signal
117	/TRANSST	Output	ASIC transfer signal
118	PMCLK	Output	Polygon clock
119	SPMT3	Output	SPF motor signal
120	SPMT2	Output	SPF motor signal
121	SPMT1	Output	SPF motor signal
122	SPMT0	Output	SPF motor signal
123	GND		DGND
124	GND		DGND
125	Vcc		CPU3.3V
126	PSL	Output	Power save LED control
127	/CS3	Output	Chip select signal
128	/CS2	Output	ASIC chip select

(3) Image process ASIC (HG73C114HF)

a. General

The ASIC is composed of the three blocks: the image process block, the print control block, and the I/F block.

Image process section

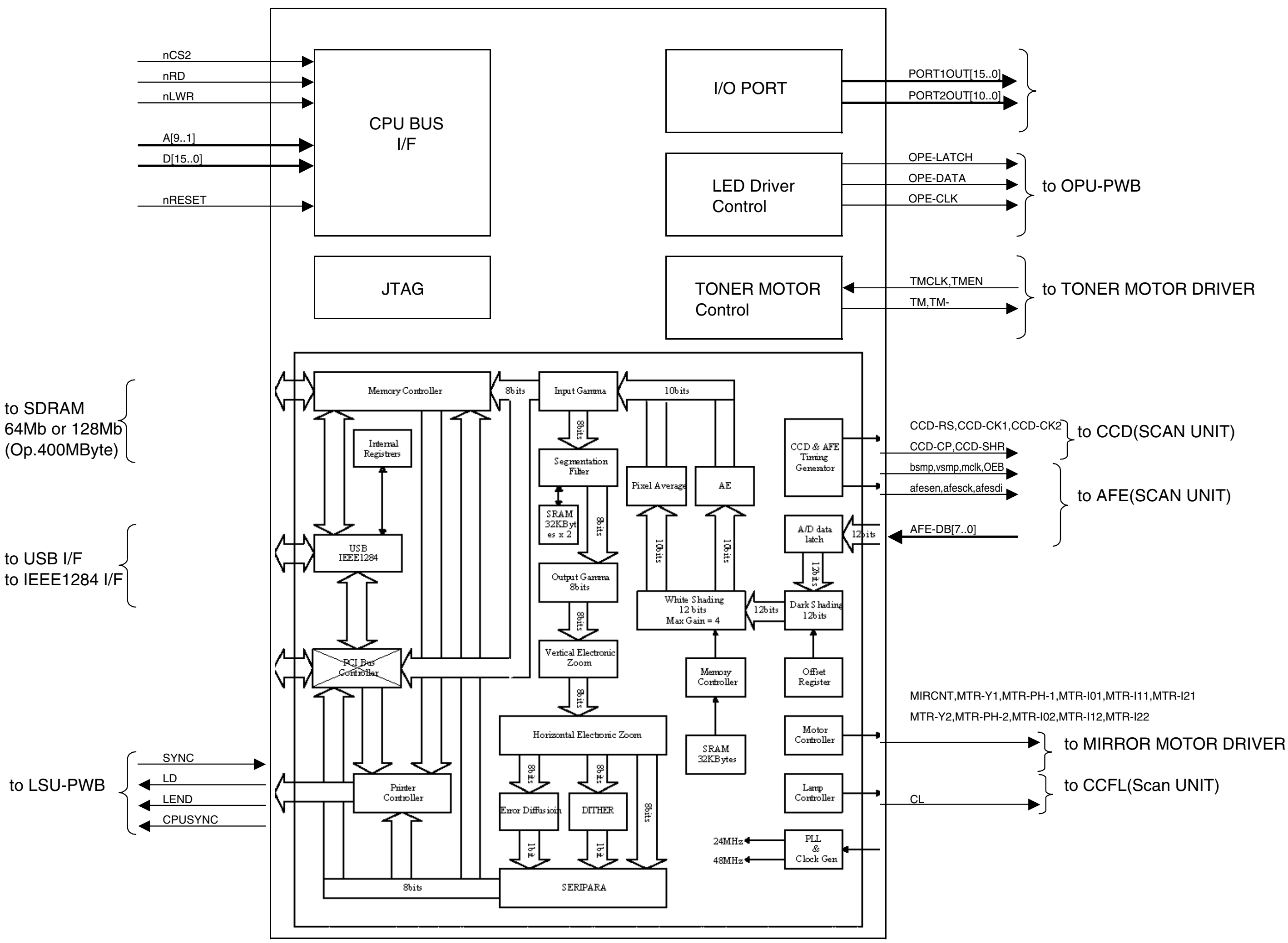
According to the operation mode set by the register set value, the image data from the CCD PWB are placed under shading, AE process, input gamma process, area separation, filter process, resolution conversion, zoom process, output gamma process, and binary coding.

Print control section

During copying, image-processed data are outputted to the LSU at the timing of LSU writing.

I/F section

This section performs DRUM control as image data buffer, image data send/receive with the OA982, and data send/receive with the IEEE1284 I/F.



b. ASIC (Signal table)

PIN No.	Signal Name	IN/OUT	Connected to	Description
1	cpudata7	IN/OUT	CPU	CPU data bus
2	cpudata6	IN/OUT	CPU	CPU data bus
3	cpudata5	IN/OUT	CPU	CPU data bus
4	cpudata4	IN/OUT	CPU	CPU data bus
5	VCC_AC	Power		
6	cpudata3	IN/OUT	CPU	CPU data bus
7	cpudata2	IN/OUT	CPU	CPU data bus
8	cpudata1	IN/OUT	CPU	CPU data bus
9	cpudata0	IN/OUT	CPU	CPU data bus
10	GND_AC	Power		
11	mircnt	OUT	Buffer IC	SPF scanner select signal
12	cpusync	OUT	CPU	CPU SYNC signal
13	mem_intr			Not used
14	arb_intr	OUT	CPU	INTR signal
15	VCC_core	Power		
16	cpu_ad8	IN	CPU	CPU address bus
17	cpu_ad7	IN	CPU	CPU address bus
18	cpu_ad6	IN	CPU	CPU address bus
19	cpu_ad5	IN	CPU	CPU address bus
20	GND_core	Power		
21	ram_clk_in	IN	ASIC	SDRAM clock on the board
22	cpu_ad4	IN	CPU	CPU address bus
23	cpu_ad3	IN	CPU	CPU address bus
24	cpu_ad2	IN	CPU	CPU address bus
25	cpu_ad1	IN	CPU	CPU address bus
26	cpu_ad0	IN	CPU	CPU address bus
27	xcpucs	IN	CPU	CS signal
28	sfclk	IN	Oscillator	Clock
29	GND_core	Power		
30	xcpuwr	IN	CPU	CPU write signal
31	xcpurd	IN	CPU	CPU read signal
32	nrst	IN	SYSTEM RESET	SYSTEM RESET
33	VCC_core	Power		
34	pfclk2	IN		Not used
35	clock_sw	IN		Pull up
36	GND_core	Power		
37	pfclk1_xout	OUT	X-tal units	VIDEO clock
38	pfclk1	IN	X-tal units	VIDEO clock
39	VSSPLL2			Pull up
40	VDDPLL2			Pull up
41	VSS2			Pull up
42	VDDI2			Pull up
43	tm2_15m			Pull up
44	xsync	IN	LSU	Horizontal sync signal from LSU (/SYNC)
45	GND_AC	Power		
46	xld	OUT	LSU	Laser drive signal
47	xlend	OUT	LSU	Laser APC signal
48	VCC_AC	Power		
49	mmd	OUT	Tr array IC	Main motor control signal. "H": Main motor ON
50	pmd	OUT	I/O	Polygon motor drive
51	tc	OUT	Tr array IC	Transfer charger control signal. "H":ON
52	gridl	OUT	Tr array IC	Main charger grid control signal. "H": L output
53	mc	OUT	Tr array IC	Main charger control signal. "H": ON
54	bias	OUT	I/O	HV bias drive
55	NC	OUT	I/O	Not used
56	vfmcnt	OUT	Tr array IC	Ventilation fan rotation speed control signal. "H": High speed, "L": Low speed
57	VCC_core	Power		
58	vfm	OUT	Tr array IC	Ventilation fan control signal. "H": Fan ON
59	/FPOFF	OUT	I/O	FAX poff signal
60	GND_core	Power		
61	DEV DIR	OUT	I/O	CRUM bus control
62	spfclh	OUT	Tr array IC	SPF/RSPF resist roller clutch control signal "H":ON
63	spfrsol	OUT	Tr array IC	SPF/RSPF document feed solenoid control signal "H":ON
64	spfgsol	OUT	Tr array IC	SPF/RSPF gate solenoid control signal "H":ON
65	spfpsol	OUT	Tr array IC	SPF/RSPF document transport solenoid control signal "H":ON
66	VCC_core	Power		
67	bias	OUT	Tr array IC	DV bias control signal. "H":ON
68	lden	OUT	Tr array IC	Laser circuit control signal. "H": Laser circuit ON
69	GND_AC	Power		
70	MRPS1	OUT	I/O	SPF current control
71	MRPS2	OUT	I/O	SPF current control
72	MRPS3	OUT	I/O	SPF current control
73	CPFS1	OUT	I/O	1st cassette pick up solenoid
74	VCC_AC	Power		
75	CPFS2	OUT	I/O	2nd cassette pick up solenoid
76	pr	OUT	I/O	Power relay control
77	hl	OUT	Tr array IC	Heater lamp control signal. "H":ON
78	GND_core	Power		
79	MPFS	OUT	I/O	Multi-bypass solenoid
80	miron	OUT	Buffer IC	SPF scanner select signal
81	spfon	OUT	Buffer IC	SPF ON signal
82	KEYSC1	OUT	I/O	Key sense control
83	KEYSC2	OUT	I/O	Key sense control
84	KEYSC3	OUT	I/O	Key sense control
85	IMC ready	OUT	I/O	IMC control
86	VCC_core	Power		
87	tmx	OUT	Buffer IC	Toner motor control signal
88	tm	OUT	Buffer IC	Toner motor control signal
89	op_data	OUT	Tr array IC	Operation circuit data signal
90	ope_latch	OUT	Tr array IC	Operation circuit latch signal. Data take-in at "L"
91	GND_AC	Power		

PIN No.	Signal Name	IN/OUT	Connected to	Description
92	op_clk	OUT	Tr array IC	Operation circuit clock signal
93	VCC_AC	Power		
94	scanstop	IN	CPU	Scan stop signal
95	testpin0	IN	TEST	TEST
96	testmode_on	IN	TEST	TEST
97	ie1284_stb	IN	I/F board connector	/STB signal (IEEE1284 communication port)
98	ie1284_autofd	IN	I/F board connector	/AUTOFD signal (IEEE1284 communication port)
99	VCC_core	Power		
100	ie1284_slctin	IN	I/F board connector	/SLCTIN signal (IEEE1284 communication port)
101	ie1284_init	IN	I/F board connector	/INIT signal (IEEE1284 communication port)
102	ie1284_slct	OUT	I/F board connector	SLCT signal (IEEE1284 communication port)
103	GND_core	Power		
104	ie1284_pe	OUT	I/F board connector	PE signal (IEEE1284 communication port)
105	ie1284_busy	OUT	I/F board connector	BUSY signal (IEEE1284 communication port)
106	ie1284_ack	OUT	I/F board connector	/ACK signal (IEEE1284 communication port)
107	ie1284_fault	OUT	I/F board connector	/FAULT signal (IEEE1284 communication port)
108	VCC_core	Power		
109	ie1284_rev	OUT	I/F board connector	/REV signal (IEEE1284 communication port)
110	ie1284_parad7	IN/OUT	I/F board connector	DATA bus (IEEE1284 communication port)
111	ie1284_parad6	IN/OUT	I/F board connector	DATA bus (IEEE1284 communication port)
112	ie1284_parad5	IN/OUT	I/F board connector	DATA bus (IEEE1284 communication port)
113	ie1284_parad4	IN/OUT	I/F board connector	DATA bus (IEEE1284 communication port)
114	ie1284_parad3	IN/OUT	I/F board connector	DATA bus (IEEE1284 communication port)
115	ie1284_parad2	IN/OUT	I/F board connector	DATA bus (IEEE1284 communication port)
116	VCC_AC	Power		
117	ie1284_parad1	IN/OUT	I/F board connector	DATA bus (IEEE1284 communication port)
118	ie1284_parad0	IN/OUT	I/F board connector	DATA bus (IEEE1284 communication port)
119	suspend	OUT	I/F board connector	SUSPEND signal (USB communication port)
120	GND_AC	Power		
121	oen	OUT	I/F board connector	OEN signal (USB communication port)
122	vmout	OUT	I/F board connector	VMOUT signal (USB communication port)
123	vpout	OUT	I/F board connector	VPOUT signal (USB communication port)
124	GND_core	Power		

PIN No.	Signal Name	IN/OUT	Connected to	Description
125	vmin	IN	I/F board connector	VMIN signal (USB communication port)
126	vpin	IN	I/F board connector	VPIN signal (USB communication port)
127	rcv	IN	I/F board connector	RCV signal (USB communication port)
128	scanst	IN	CPU	Scan start signal
129	printst	IN	Start signal	Start signal
130	receptst	IN	Start signal	Start signal
131	transst	IN	CPU	Data transfer start signal
132	VCC_core	Power		
133	dci_dat7	IN	E-SORT (OA982)	E-SORT data bus
134	dci_dat6	IN	E-SORT (OA982)	E-SORT data bus
135	dci_dat5	IN	E-SORT (OA982)	E-SORT data bus
136	dci_dat4	IN	E-SORT (OA982)	E-SORT data bus
137	dci_dat3	IN	E-SORT (OA982)	E-SORT data bus
138	dci_dat2	IN	E-SORT (OA982)	E-SORT data bus
139	dci_dat1	IN	E-SORT (OA982)	E-SORT data bus
140	dci_dat0	IN	E-SORT (OA982)	E-SORT data bus
141	GND_core	Power		
142	out_dc_req	IN	E-SORT (OA982)	E-SORT control signal
143	in_dc_req	IN	E-SORT (OA982)	E-SORTcontrol signal
144	GND_AC	Power		
145	out_dc_ack	OUT	E-SORT (OA982)	E-SORT control signal
146	out_dc_wt	OUT	E-SORT (OA982)	E-SORT control signal
147	VCC_AC	Power		
148	in_dc_ack	OUT	E-SORT (OA982)	E-SORTcontrol signal
149	in_dc_cs	OUT	E-SORT (OA982)	E-SORTcontrol signal
150	dco_dat7	OUT	E-SORT (OA982)	E-SORT data bus
151	dco_dat6	OUT	E-SORT (OA982)	E-SORT data bus
152	dco_dat5	OUT	E-SORT (OA982)	E-SORT data bus
153	dco_dat4	OUT	E-SORT (OA982)	E-SORT data bus
154	dco_dat3	OUT	E-SORT (OA982)	E-SORT data bus
155	VCC_AC	Power		
156	dco_dat2	OUT	E-SORT (OA982)	E-SORT data bus
157	dco_dat1	OUT	E-SORT (OA982)	E-SORT data bus
158	dco_dat0	OUT	E-SORT (OA982)	E-SORT data bus
159	hsync		FAX	FAX
160	GND_core	Power		
161	out_req			Not used
162	in_ack			Not used
163	in_cs			Not used
164	GND_AC	Power		

PIN No.	Signal Name	IN/OUT	Connected to	Description
165	mdat00			Not used
166	mdat01			Not used
167	mdat02			Not used
168	mdat03			Not used
169	VCC_core	Power		
170	mdat04			Not used
171	mdat05			Not used
172	mdat06			Not used
173	GND_core	Power		
174	mdat07			Not used
175	mdat08			Not used
176	mdat09			Not used
177	VCC_AC	Power		
178	mdat10			Not used
179	mdat11			Not used
180	mdat12			Not used
181	VCC_core	Power		
182	mdat13			Not used
183	mdat14			Not used
184	mdat15			Not used
185	GND_AC	Power		
186	pcl_s_print			Not used
187	fax_s_print			Not used
188	es_s_print			Not used
189	out_ack			Not used
190	out_cs			Not used
191	in_req			Not used
192	VCC_core	Power		
193	TCK		JTAG	Not used
194	TMS		JTAG	Not used
195	TRSTA		JTAG	Not used
196	TDI		JTAG	Not used
197	TDO		JTAG	Not used
198	GND_core	Power		
199	afp_vsmp	OUT	CCD PWB	AFE control signal
200	ccd_tg	OUT	CCD PWB	CCD control signal
201	ccdrs	OUT	CCD PWB	CCD control signal
202	afp_bsmp	OUT	CCD PWB	AFE control signal
203	ccdcp	OUT	CCD PWB	CCD control signal
204	afe_sdata	IN	CCD PWB	AD's serial data
205	ccd_ph2	OUT	CCD PWB	CCD control signal
206	ccd_ph1	OUT	CCD PWB	CCD control signal
207	afp_afesen	OUT	CCD PWB	AFE control signal
208	GND_core	Power		
209	afp_adcclk	OUT	CCD PWB	AFE control signal
210	VCC_core	Power		
211	afp_afesck	OUT	CCD PWB	AFE control signal
212	GND_AC	Power		
213	afp_data7	IN	CCD PWB	Image scan data
214	afp_data6	IN	CCD PWB	Image scan data
215	afp_data5	IN	CCD PWB	Image scan data
216	afp_data4	IN	CCD PWB	Image scan data
217	afp_data3	IN	CCD PWB	Image scan data
218	afp_data2	IN	CCD PWB	Image scan data
219	afp_data1	IN	CCD PWB	Image scan data
220	afp_data0	IN	CCD PWB	Image scan data
221	VCC_AC	Power		
222	cl	OUT	Logic IC	Copy lamp control signal
223	GND_core	Power		
224	mtr_y3	OUT	I/O	Carriage motor current control signal
225	mtr_y2	OUT	Tr array IC	Carriage motor current control signal

PIN No.	Signal Name	IN/OUT	Connected to	Description
226	mtr_y1	OUT	Tr array IC	Carriage motor current control signal
227	VCC_core	Power		
228	mtr_phase2	OUT	Motor driver	Carriage motor control signal
229	mtr_i02	OUT	Motor driver	Carriage motor control signal
230	mtr_i12	OUT	Motor driver	Carriage motor control signal
231	mtr_i22	OUT	Motor driver	Carriage motor control signal
232	mtr_phase1	OUT	Motor driver	Carriage motor control signal
233	mtr_i01	OUT	Motor driver	Carriage motor control signal
234	mtr_i11	OUT	Motor driver	Carriage motor control signal
235	mtr_i21	OUT	Motor driver	Carriage motor control signal
236	GND_AC	Power		
237	ram_mad3	OUT	SDRAM	SDRAM (Image process page memory) address bus
238	ram_mad2	OUT	SDRAM	SDRAM (Image process page memory) address bus
239	GND_core	Power		
240	ram_mad1	OUT	SDRAM	SDRAM (Image process page memory) address bus
241	ram_mad0	OUT	SDRAM	SDRAM (Image process page memory) address bus
242	ram_mad10	OUT	SDRAM	SDRAM (Image process page memory) address bus
243	VCC_core	Power		
244	ram_banks1	OUT	SDRAM	SDRAM (Image process page memory) BANK signal
245	ram_banks0	OUT	SDRAM	SDRAM (Image process page memory) BANK signal
246	xram_cs	OUT		SDRAM (Image process page memory) CS signal
247	xram_ras	OUT	SDRAM	SDRAM (Image process page memory) RAS signal
248	xram_cas	OUT	SDRAM	SDRAM (Image process page memory) CAS signal
249	VCC_AC	Power		
250	xram_wde	OUT	SDRAM	SDRAM (Image process page memory) WDE signal
251	ram_dqm0	OUT	SDRAM	SDRAM (Image process page memory) DQM signal
252	GND_AC	Power		
253	ram_data7	IN/OUT	SDRAM	SDRAM (Image process page memory) data bus

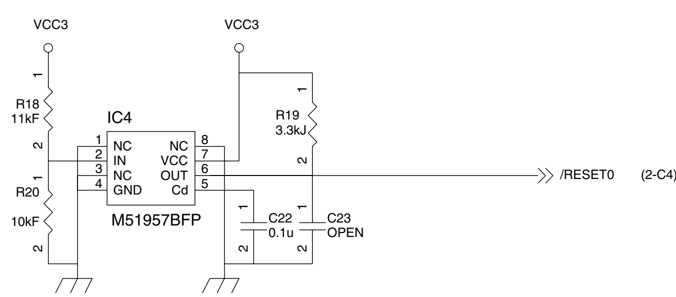
PIN No.	Signal Name	IN/OUT	Connected to	Description
254	ram_data6	IN/OUT	SDRAM	SDRAM (Image process page memory) data bus
255	ram_data5	IN/OUT	SDRAM	SDRAM (Image process page memory) data bus
256	ram_data4	IN/OUT	SDRAM	SDRAM (Image process page memory) data bus
257	GND_core	Power		
258	ram_data3	IN/OUT	SDRAM	SDRAM (Image process page memory) data bus
259	ram_data2	IN/OUT	SDRAM	SDRAM (Image process page memory) data bus
260	ram_data1	IN/OUT	SDRAM	SDRAM (Image process page memory) data bus
261	ram_data0	IN/OUT	SDRAM	SDRAM (Image process page memory) data bus
262	GND_AC	Power		
263	ram_data15	IN/OUT	SDRAM	SDRAM (Image process page memory) data bus
264	ram_data14	IN/OUT	SDRAM	SDRAM (Image process page memory) data bus
265	VCC_AC	Power		
266	ram_data13	IN/OUT	SDRAM	SDRAM (Image process page memory) data bus
267	ram_data12	IN/OUT	SDRAM	SDRAM (Image process page memory) data bus
268	ram_data11	IN/OUT	SDRAM	SDRAM (Image process page memory) data bus
269	ram_data10	IN/OUT	SDRAM	SDRAM (Image process page memory) data bus
270	ram_data9	IN/OUT	SDRAM	SDRAM (Image process page memory) data bus
271	ram_data8	IN/OUT	SDRAM	SDRAM (Image process page memory) data bus
272	VCC_core	Power		
273	ram_dqm1	OUT	SDRAM	SDRAM (Image process page memory) DQM signal
274	ram_cke	OUT	SDRAM	SDRAM (Image process page memory) CKE signal
275	GND_AC	Power		
276	ram_clk_out		SDRAM	SDRAM's clock
277	GND_core	Power		
278	ram_mad12	OUT	SDRAM	SDRAM (Image process page memory) address bus
279	ram_mad11	OUT	SDRAM	SDRAM (Image process page memory) address bus
280	ram_mad9	OUT	SDRAM	SDRAM (Image process page memory) address bus
281	VCC_core	Power		
282	ram_mad8	OUT	SDRAM	SDRAM (Image process page memory) address bus
283	ram_mad7	OUT	SDRAM	SDRAM (Image process page memory) address bus
284	VCC_AC	Power		
285	ram_mad6	OUT	SDRAM	SDRAM (Image process page memory) address bus
286	ram_mad5	OUT	SDRAM	SDRAM (Image process page memory) address bus
287	ram_mad4	OUT	SDRAM	SDRAM (Image process page memory) address bus
288	GND_AC	Power		
289	cpudata15	IN/OUT	CPU	CPU data bus
290	cpudata14	IN/OUT	CPU	CPU data bus
291	cpudata13	IN/OUT	CPU	CPU data bus
292	cpudata12	IN/OUT	CPU	CPU data bus
293	cpudata11	IN/OUT	CPU	CPU data bus
294	cpudata10	IN/OUT	CPU	CPU data bus
295	cpudata9	IN/OUT	CPU	CPU data bus
296	cpudata8	IN/OUT	CPU	CPU data bus

(4) Reset circuit

This circuit detects ON/OFF of the power source, and controls start/stop of each circuit. The voltage of 3.3V in the MCU PWB is detected by the reset IC to generate the reset signal.

When the power voltage reaches the specified level, each circuit is operated, but stopped before the power voltage falls below the specified level in order to protect against malfunction of the circuit. The CPU/Flash ROM is reset by the power reset circuit, and system reset of ASIC, OA982, FAX, and NIC is generated from the CPU (general-purpose port output).

Reset IC

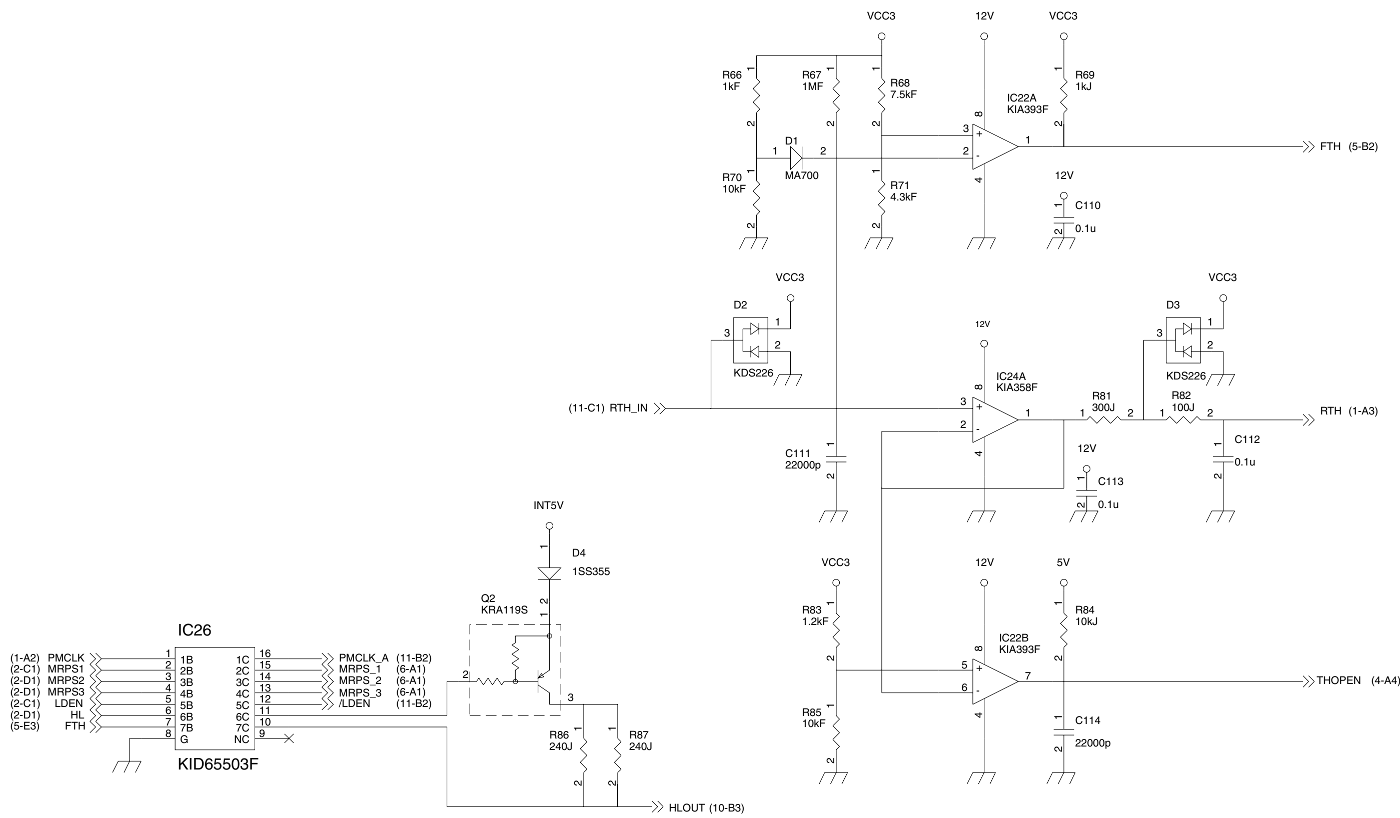


(5) Heater lamp control circuit

a. Outline

The heater lamp control circuit detects the heat roller surface temperature, and converts the temperature into a voltage. The converted voltage is inputted to the CPU.

The CPU converts the inputted analog voltage into a digital value. The digital conversion value and the set value of the test command are compared to control ON/OFF of the heater lamp according to the level, controlling the heat roller surface temperature to be the fixed level.



[High temperature protection circuit in case of CPU hung up (uncontrollable)]

For IC22 3Pin (reference voltage), +3.3V is divided by the resistor. The thermistor terminal voltage is inputted to IC22 2Pin. When, therefore, the voltage at 2Pin falls below the voltage at 3Pin, IC22 1Pin becomes "H" and the HL signal is pulled to the GND level, suppressing generation of the lighting signal of the heater lamp. (IC22 output 1Pin is normally Low.)

[When the heat roller surface temperature is lower than the set level]

a. When the thermistor terminal voltage is higher than the set level, the output signal HL from ASIC becomes HIGH level.

b. This HL signal becomes the HLOUT signal through IC26, and is inputted to the photo triac coupler in the power PWB. When, therefore, the HL signal is HIGH, the internal triac turns on.

c. When the internal triac turns on, the heater lamp lights up.

[When the heat roller surface temperature is higher than the set level]

a. When the thermistor terminal voltage falls below the set level, the output signal HL from ASIC becomes LOW level.

b. The HL signal becomes LOW, the power PWB photo triac coupler turns OFF, and the heater lamp turns OFF.

[When the thermistor is open]

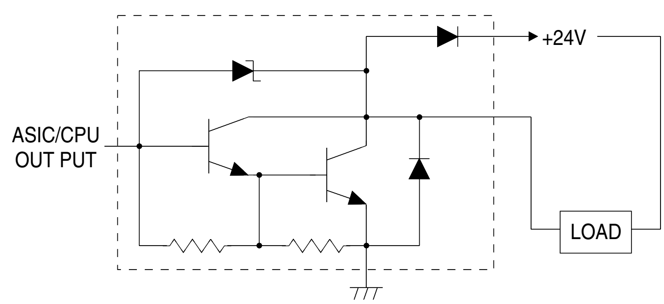
The voltage at IC22 6Pin becomes higher than the voltage at 5Pin, and the 7Pin output THOPEN becomes LOW. This is inputted to the CPU to display the trouble code H2.

(6) Driver circuit (Clutch, solenoid)

Since a load cannot be directly driven by each load signal from the CPU or the ASIC, each load is driven through the driver IC (transistor array).

A large drive current (load current) is ordained from a small input current (ASIC output current).

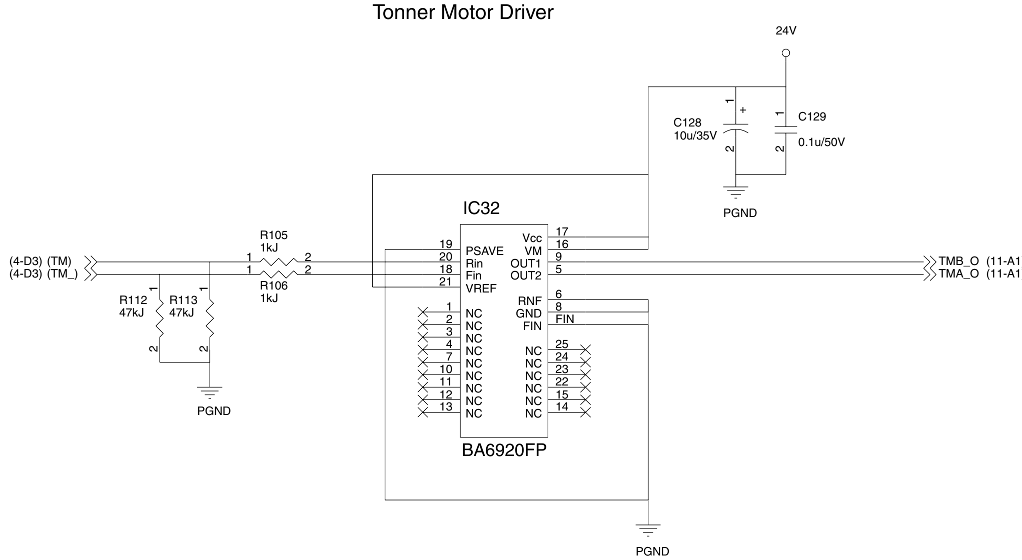
When the driver input voltage (base resistor input) is HIGH, the transistor turns ON to flow a current through the load, operating the load.



(7) Toner motor control circuit

The IC32 is the motor drive IC, which generates pseudo-AC waveforms by the pulse signal from the ASIC to drive the toner supply motor.

Tonner Motor Driver

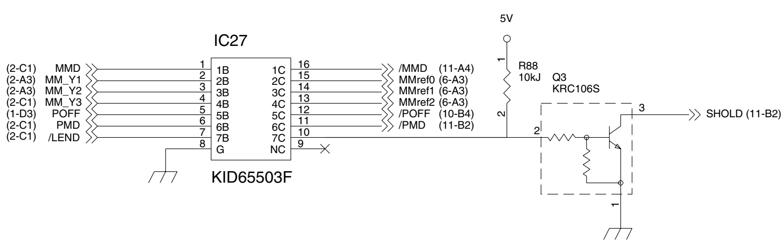


(8) Main motor control circuit/ LSU (Polygon motor) control circuit

The motors are driven by the MMD (main motor) signal and the PMD (polygon motor) signal from the ASIC.

The MMD signal and the PMD signal are turned HIGH and sent through the driver IC27 to the control circuit in the main motor/LSU, rotating each motor.

When the motor RPM reaches the specified level, the MMLD signal (main) and the PMLD signal (LSU) become LOW. The CPU detects it to start process control.



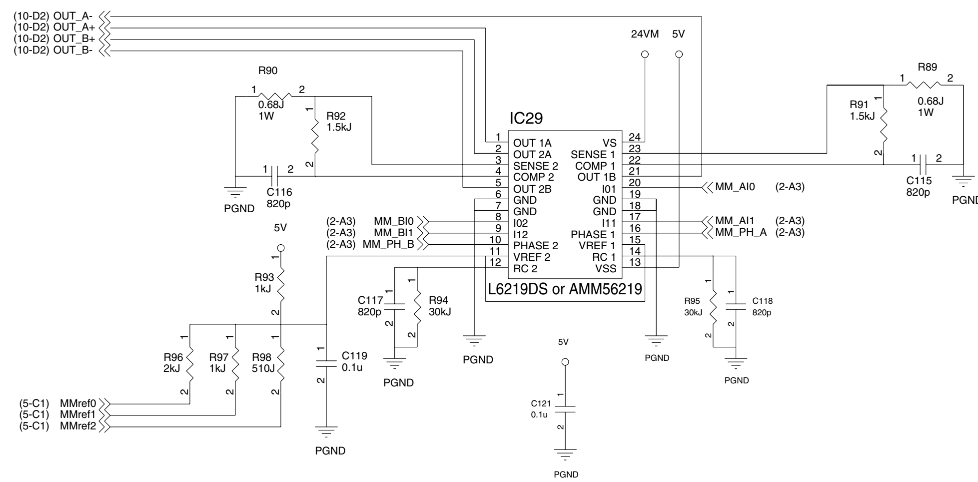
(9) Mirror motor control circuit, SPF motor control circuit, Duplex motor control circuit, Shifter motor control circuit.

Stepping motors are employed for the mirror motor, the SPF motor, and the duplex motor. The driver for IC29 (for the mirror motor) is the bipolar drive constant current drive IC. The drive for IC31 (for the SPF) is the uni-polar drive constant current drive IC. The drive for IC28 (for the duplex) and IC30 (for the shifter) is the constant current drive IC.

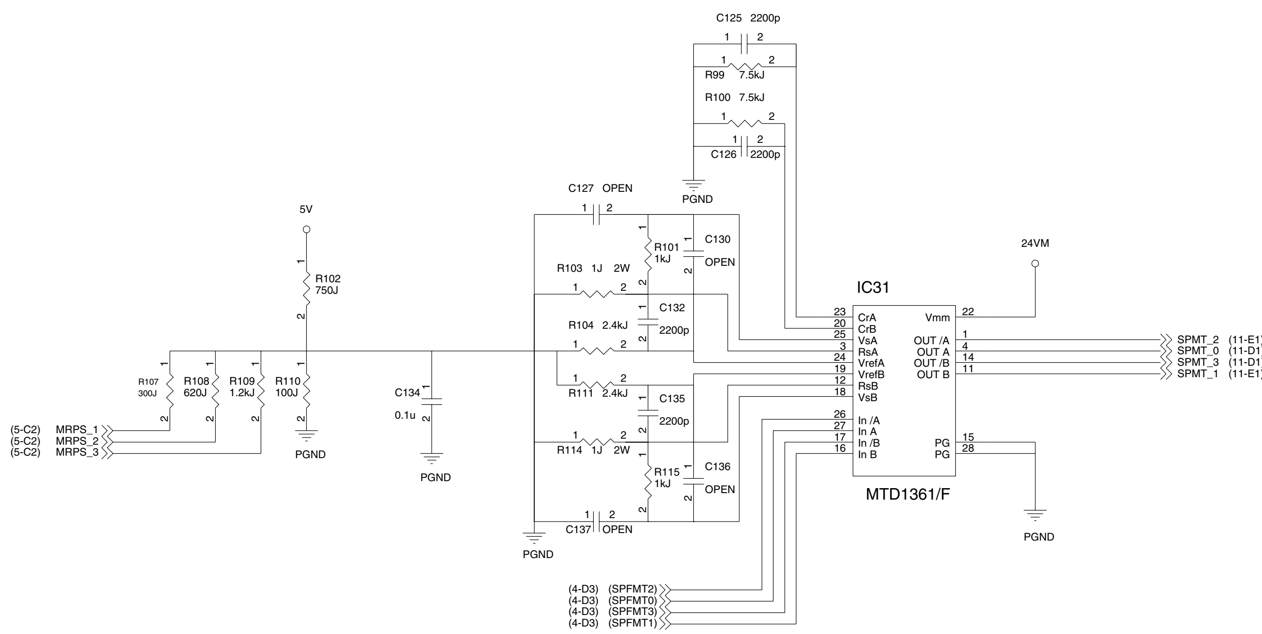
Each motor is driven in W1-2 phase excitement, 1-2 phase excitement, or 2-phase excitement.

The mirror motor/SPF motor related to image scan are driven by a constant current, and each motor current is switched in each magnification ratio.

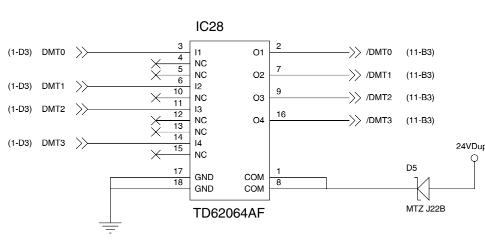
Scanner Motor Driver



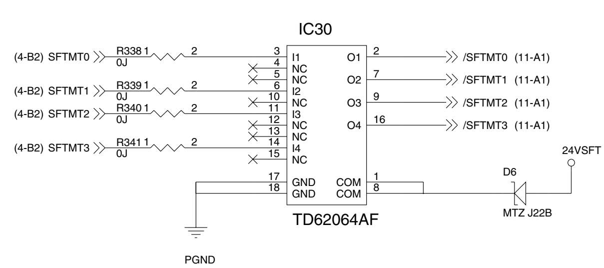
SPF Motor Driver



Duplex Motor Driver



Shifter Motor Driver



(10) OPE PWB

a. Outline

The operation circuit is composed of the LCD control circuit, the key matrix circuit, the display matrix circuit, and the buzzer circuit, realizing the U/I functions.

b. LCD control circuit

The character LCD (COG) in 2 lines and 16 digits is used. The display data are sent from the MCU (CPU) to LCD internal registers, controlling the LCD.

c. Key matrix circuit

The SEL signal is sent from the CPU of MCU to the matrix selector IC (multiplexer) in the operation circuit. The signal detects OFF/ON of the key, and is sent to the CPU as serial data.

d. LED matrix circuit

The display is controlled by inputting the serial data signal, the clock signal, and the latch signal from ASIC to the LED driver in the operation circuit.

In the LED driver, data are set to the register (8bit) and latched to control the IC output port, performing matrix-driving of ON/OFF of the LED.

(11) Carriage Unit

a. Outline

The carriage unit is provided with the CCD PWB, the inverter PWB, the lamps, etc. A document is radiated, and image data read by the CCD are A/D converted to be sent to the ASIC.

b. CCD PWB

The color image sensor uPD8861 (5400 pixels x 3 lines) is used as the CCD on the CCD PWB to scan images in the resolution of 600dpi/US letter size in the main scanning direction.

Image data scanned by the CCD are inputted to AFE (AD9826), where they are A/D-converted to output digital data. The output digital data are sent to the MCU PWB and to the ASIC. The ASIC performs image process with the digital data.

c. Lamp inverter PWB

The transformer is controlled by the lamp control signal from the MCU PWB to turn ON/OFF the cool cathode ray tube by the transformer output.

B. DC power circuit

The DC power circuit directly rectifies the AC power and performs switching-conversion with the DC/DC converter circuit, and rectifies and smoothes again to generate a DC voltage.

The constant voltage control circuit is of +5VEN. +24V and +12V are of the non-control system by winding from the +5VEN winding. As shown in fig (1), +24V, +12V, and +5V are provided with the ON/OFF function by external signals. +3.3V is outputted from +5VEN to the regulator IC.

Refer to the block diagram, fig (1).

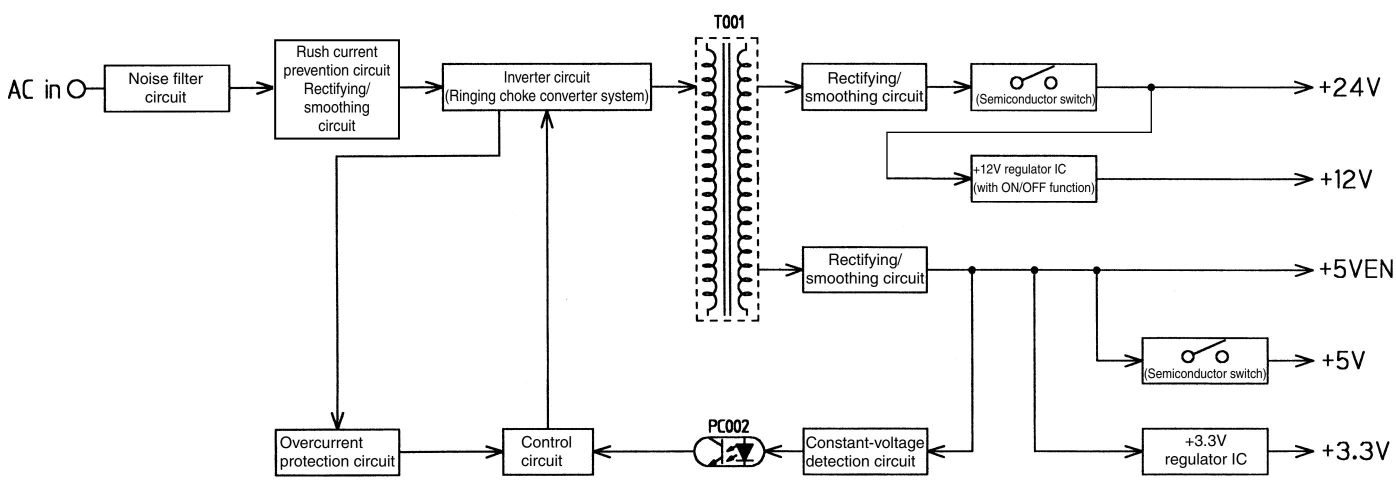


fig (1) Block diagram

(1) Noise filter circuit

The filter circuit is composed of L and C. It reduces common noises and normal mode noises generated from the AC line.

The common noise means that generated in each line for GND. Its noise component is delivered through C002, C003, and C022 to GND.

The normal noise means that overlapped in the AC line or the output line. It is attenuated by C023, C001, L002, C004, and L003. Refer to fig (2).

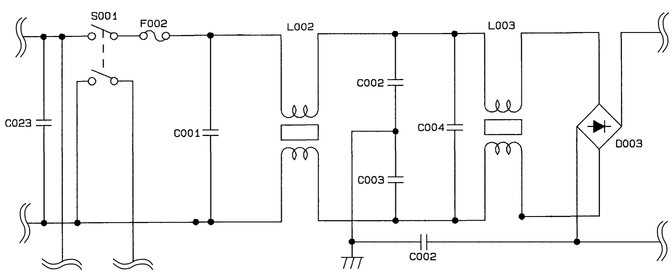


fig (2) Noise filter circuit

(2) Rush current prevention circuit and rectifying/ smoothing circuit

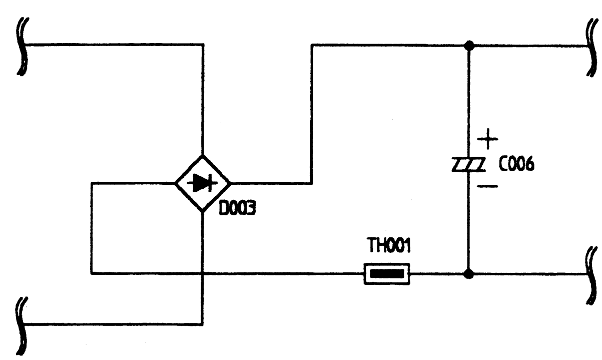


fig (3) Rush current prevention, rectifying/smoothing circuit

Since the AC power is directly rectified, if there were not this rush current prevention resistor (TH001), an extremely large rush current would flow due to a charging current flowing through the smoothing capacitor C006 when turning on the power.

To prevent against this, the rush current prevention resistor TH001 is provided between the rectifying diode D003 and the smoothing diode C006, suppressing a rush current.

The rectifying/smoothing circuit rectifies a 60Hz AC voltage with the rectifying circuit, and smoothes it with the smoothing capacitor C006.

(3) Inverter and control circuit (Ringing choke converter system)

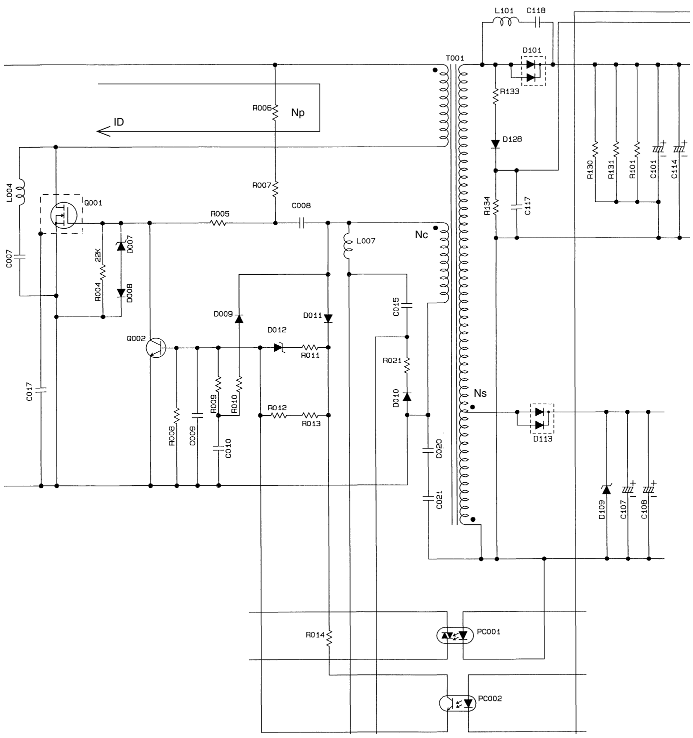


Fig. (4) Inverter and control circuit

When the power is supplied to this circuit, the DC voltage, Vref, supplied by the rectifying/smoothing circuit is applied through R006 and R007 to FET (Q001), turning on Q001.

When Q001 is turned on, the drain current, I_D, flows as the waveform B in Fig. (5) to apply V_{DC} to the main winding, N_P, on the primary side.

At the same time, a voltage is generated in N_C winding and applied through R005 and C008b to the gate of Q001. As a result, Q001 is turned on rapidly.

At the same time with this, C009 is charged through D001, R001, and D012. When the potential of C009 reaches 0.7V (= V_{BE} of Q002), Q002 turns on to turn off Q001.

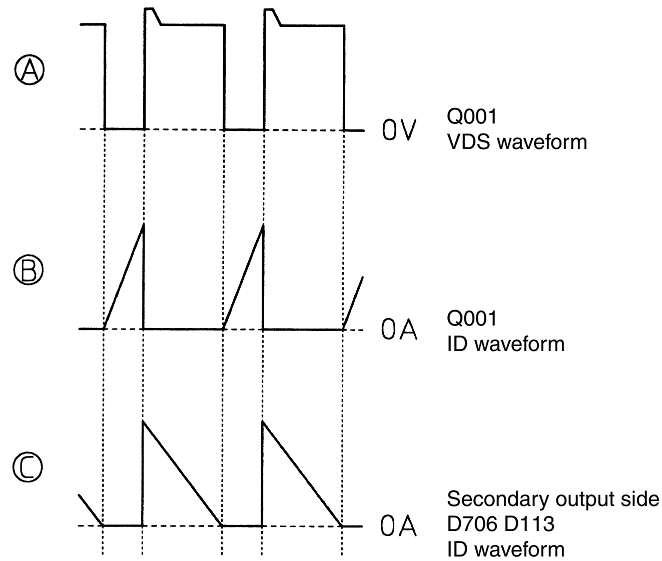


Fig. (5) Ringing choke converter operation waveforms

When Q001 turns off, energy accumulated in the transformer (T001) flows a current of waveform C in the path indicated with dotted line as shown in the figure above through D101 and D113 and dissipates to the secondary output side. When this energy is exhausted, the current flowing through D101 and D113 turns off. However, the N_S winding has a slight remaining energy, which generates a voltage in the base winding N_C and turns on Q001 again to repeat switching operation, supplying a high frequency power to the secondary side.

(4) Overcurrent protection circuit (Primary side)

The ON period extension due to an increased output load is detected, and the OFF period of Q001 is extended by the control circuit, and energy accumulated in the primary winding of the transformer T001 is reduced, providing protection against an overcurrent. Refer to Fig. (4).

(5) Rectifying/smoothing circuit (+5V)

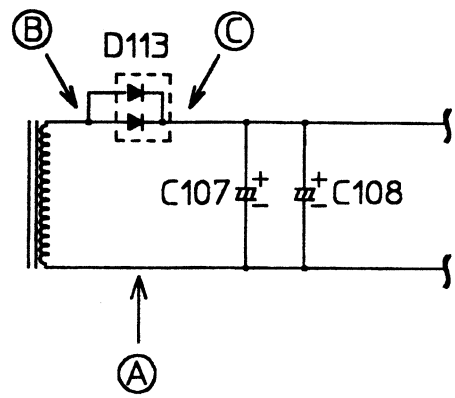


fig (6) Rectifying/smoothing circuit

The high frequency pulse generated by the inverter circuit is decreased by the converter transformer, rectified by the high frequency diode D113, and smoothed by C107 and C108.

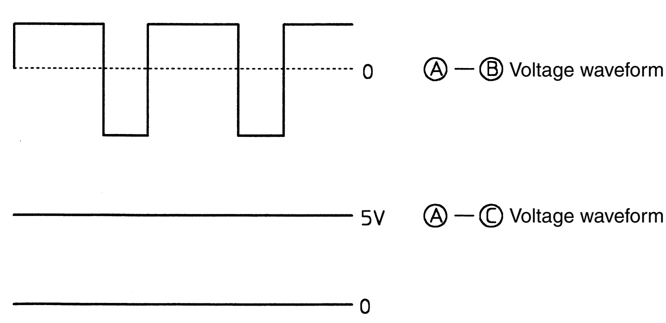
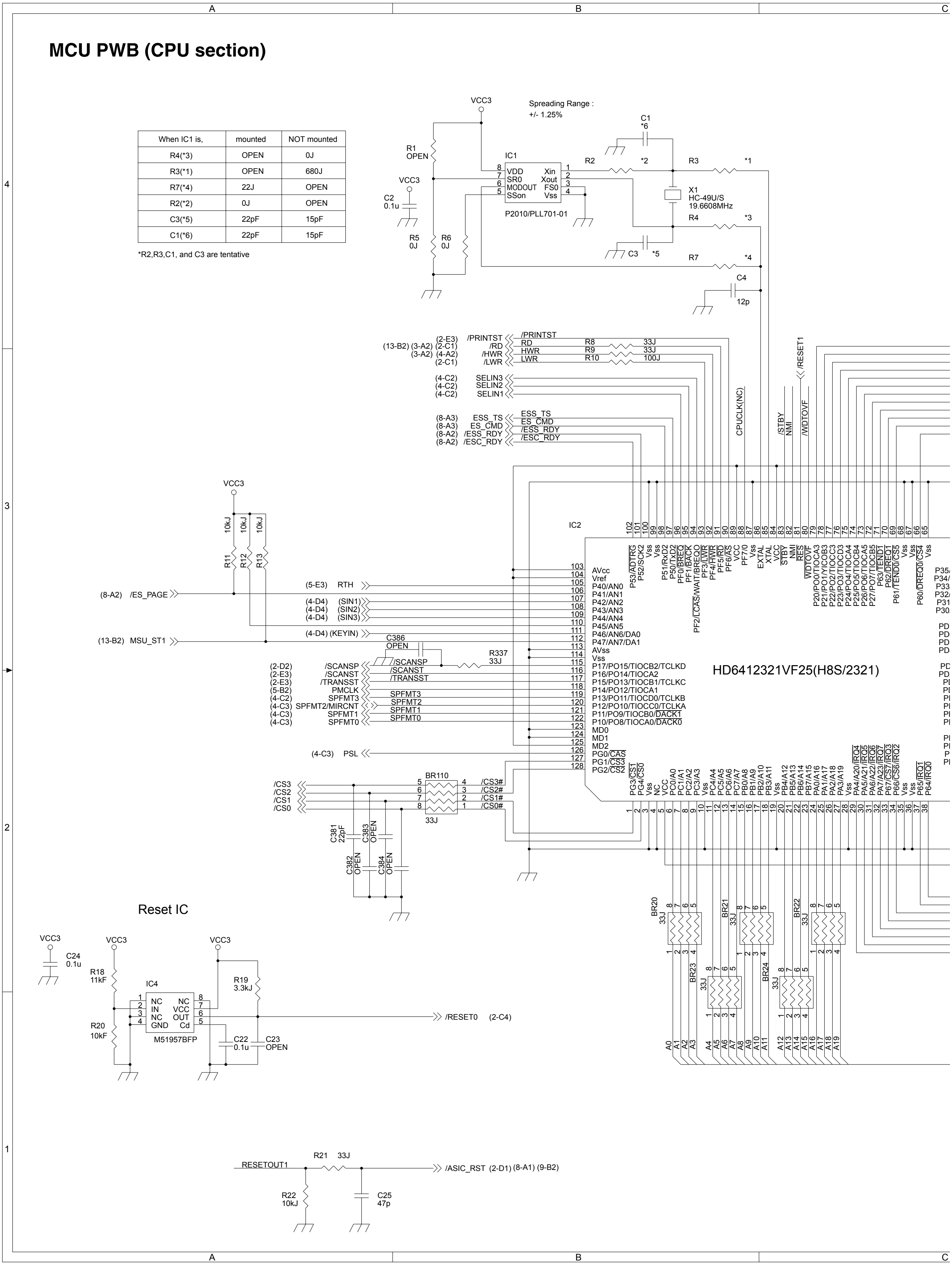


fig (7) +5V rectifying/smoothing circuit voltage waveform

Memo

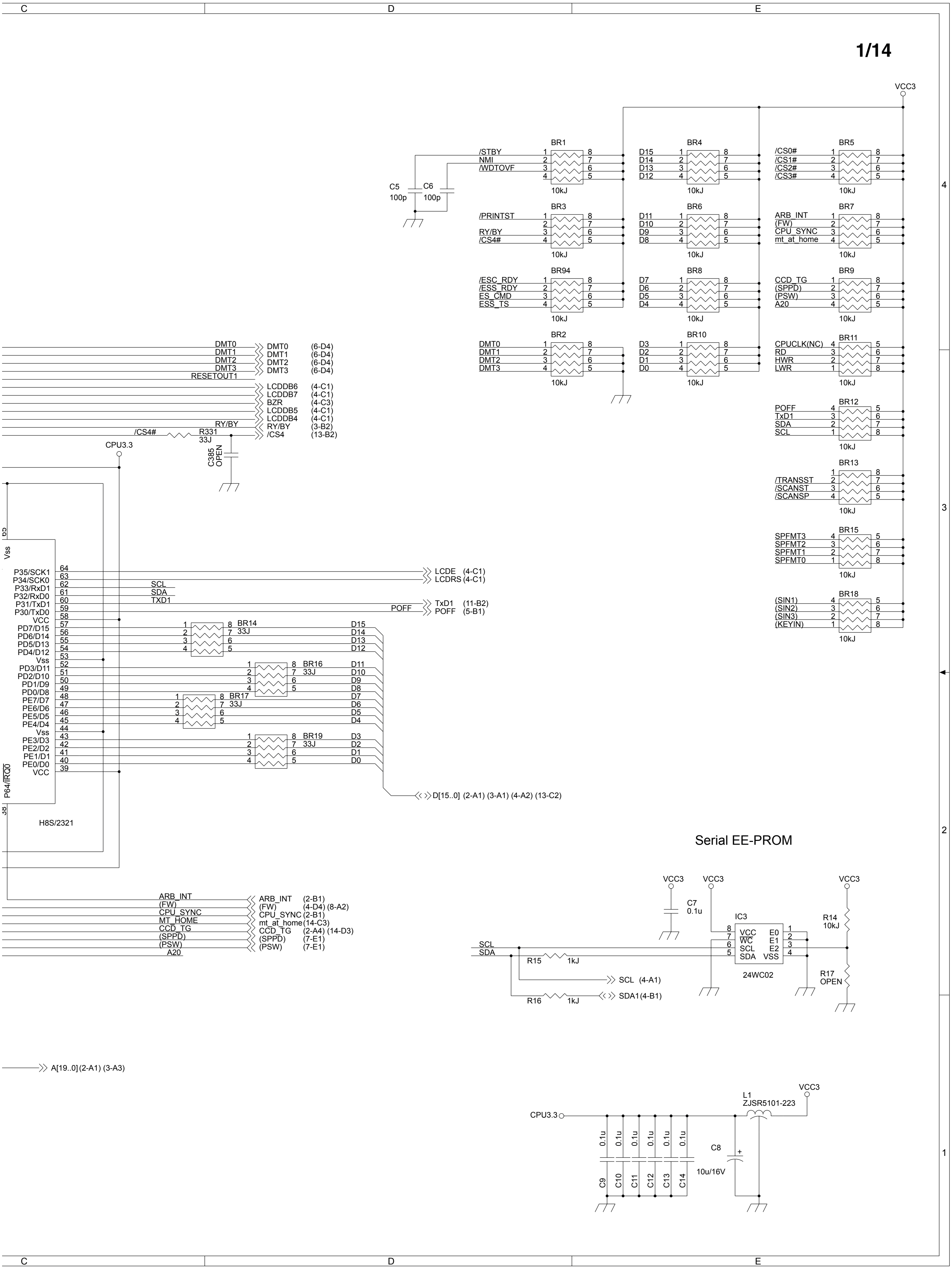
[14]CIRCUIT DIAGRAM

1. MCU PWB



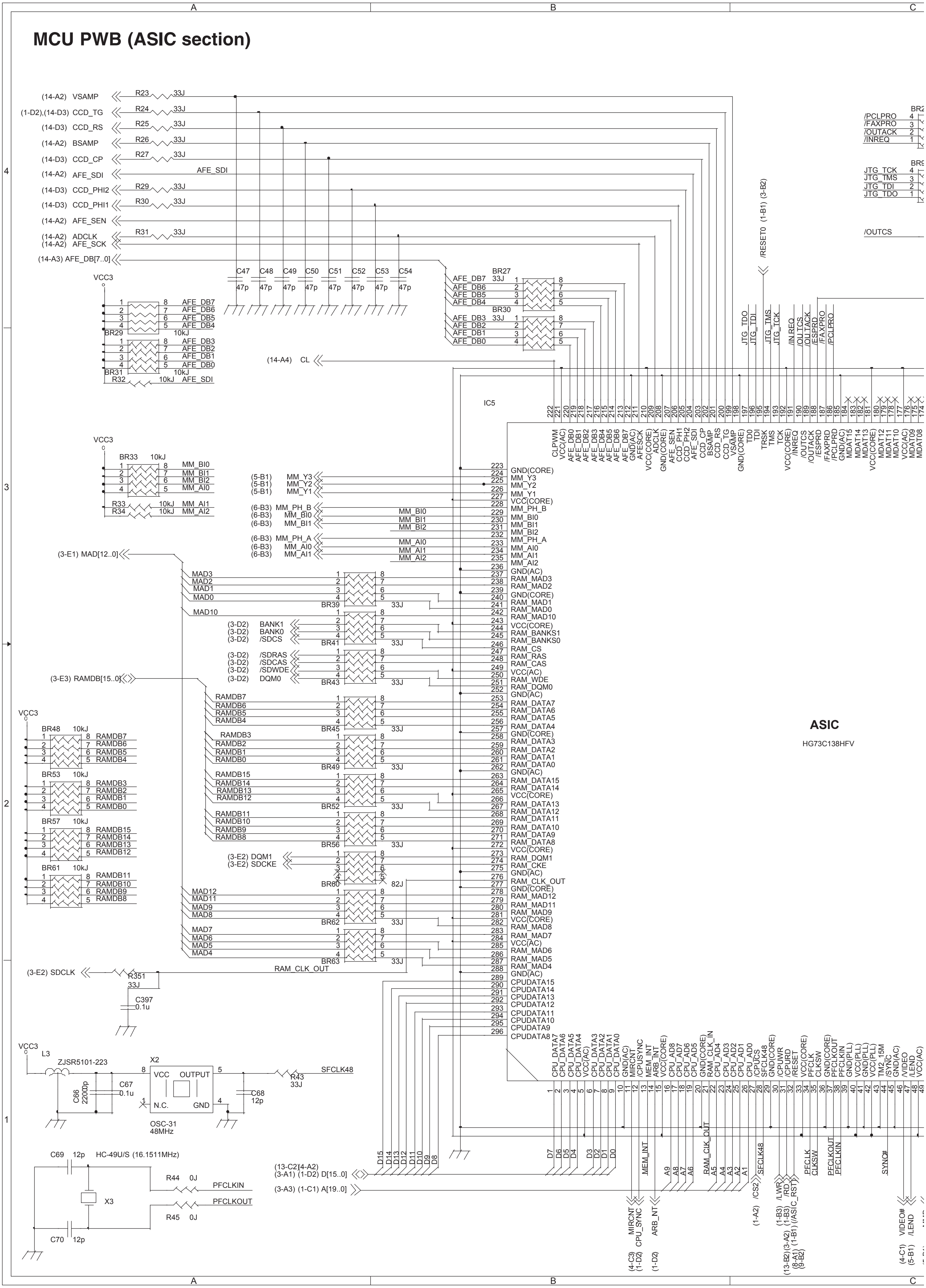
When IC1 is,	mounted	NOT mounted
R4(*3)	OPEN	0J
R3(*1)	OPEN	680J
R7(*4)	22J	OPEN
R2(*2)	0J	OPEN
C3(*5)	22pF	15pF
C1(*6)	22pF	15pF

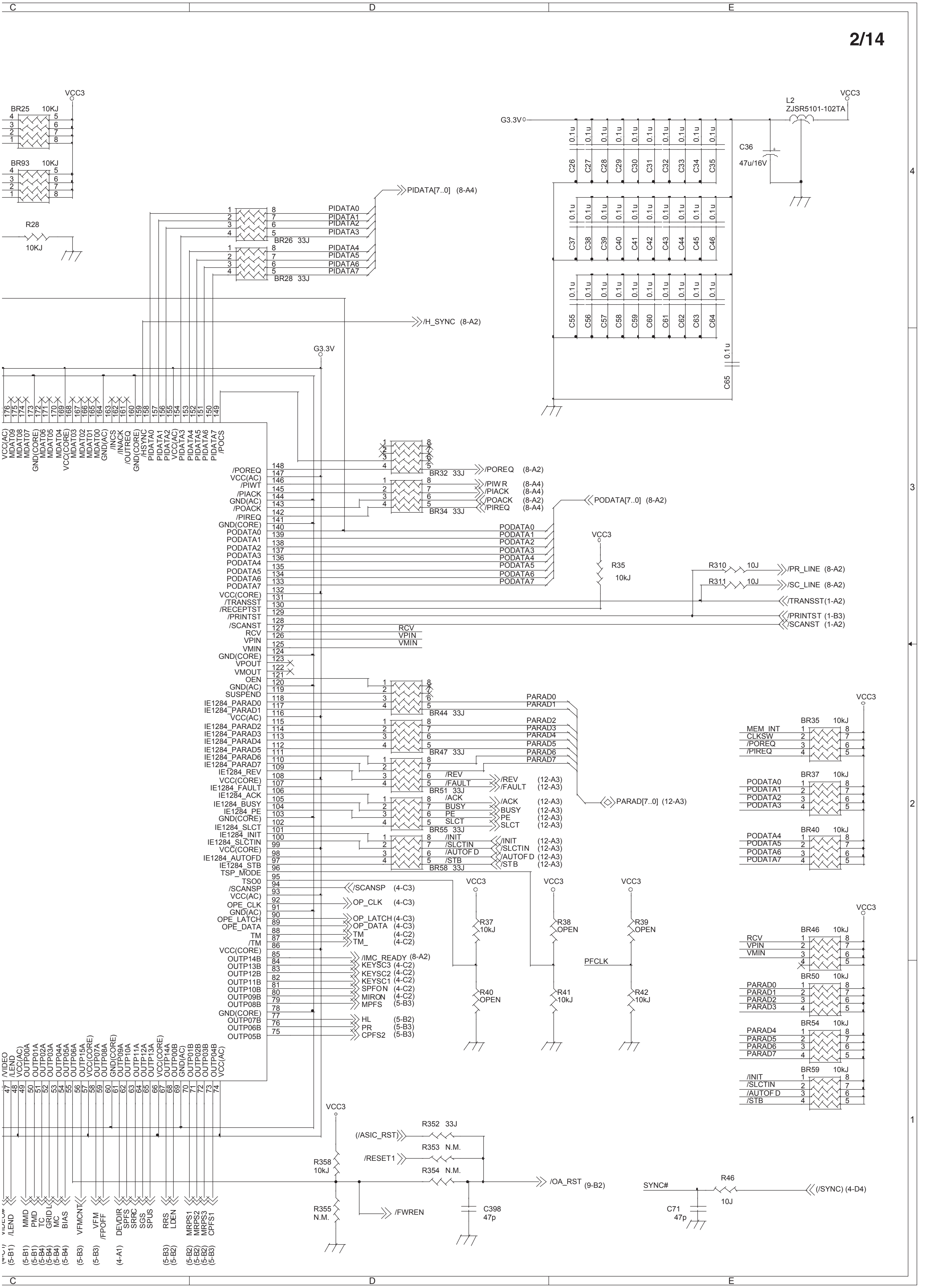
*R2,R3,C1, and C3 are tentative



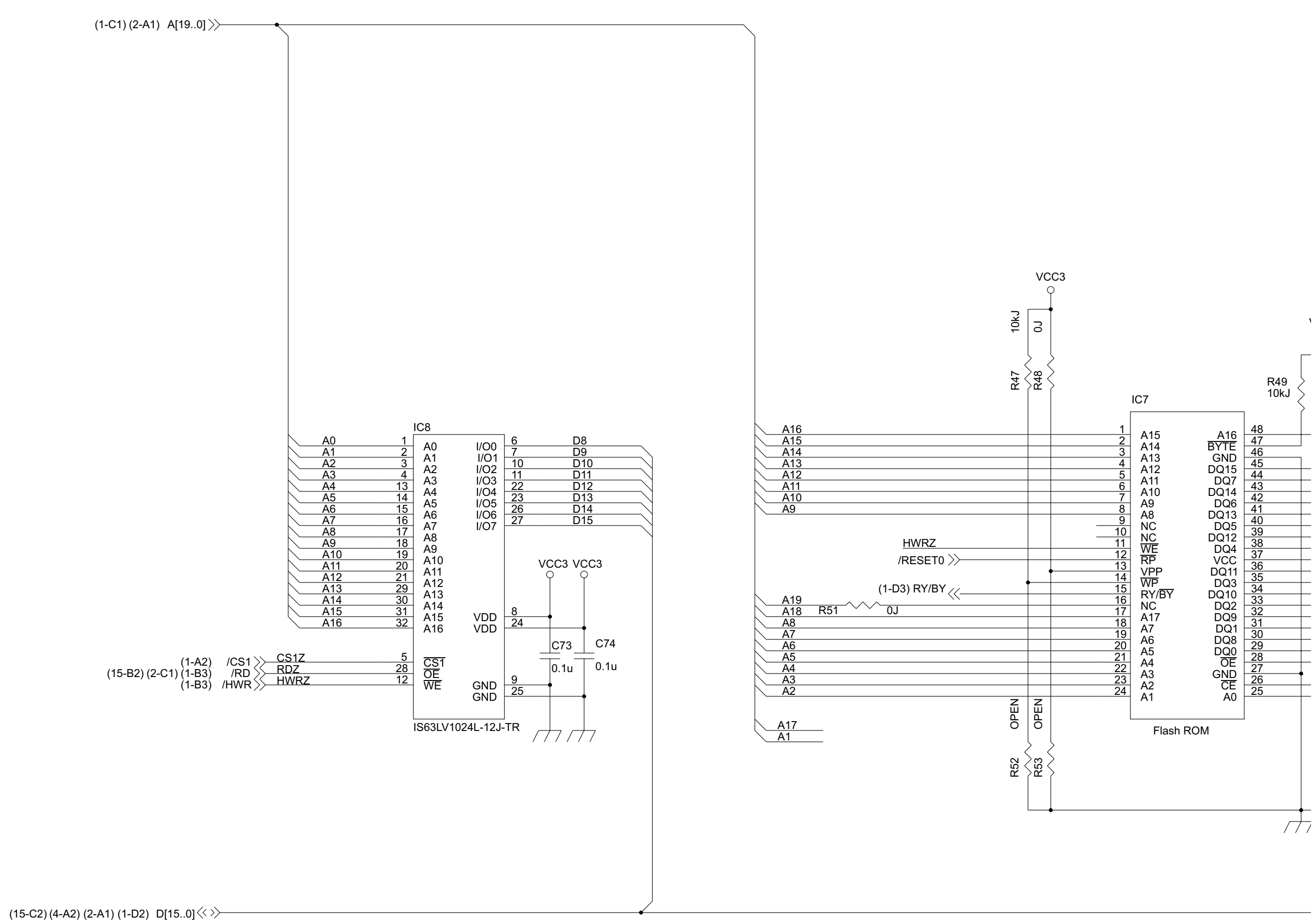
1/14
VCC3
BR1
/STBY
NMI
/WDTOVF
C5
100p
C6
100p
10kJ
BR4
D15
D14
D13
D12
BR5
/CS0#
/CS1#
/CS2#
/CS3#
BR3
/PRINTST
RY/BY
/CS4#
BR6
D11
D10
D9
D8
BR7
ARB_INT
(FW)
CPU_SYNC
mt_at_home
BR94
/ESC_RDY
/ESS_RDY
ES_CMD
ESS_TS
BR8
D7
D6
D5
D4
BR9
CCD_TG
(SPPD)
(PSW)
A20
BR2
DMT0
DMT1
DMT2
DMT3
BR10
D3
D2
D1
D0
BR11
CPUCLK(NC)
RD
HWR
LWR
BR12
POFF
TxD1
SDA
SCL
BR13
/TRANSST
/SCANST
/SCANSP
BR15
SPFMT3
SPFMT2
SPFMT1
SPFMT0
BR18
(SIN1)
(SIN2)
(SIN3)
(KEYIN)
DMT0 (6-D4)
DMT1 (6-D4)
DMT2 (6-D4)
DMT3 (6-D4)
RESETOUT1
LCDDB6 (4-C1)
LCDDB7 (4-C1)
BZR (4-C3)
LCDDB5 (4-C1)
LCDDB4 (4-C1)
RY/BY (3-B2)
/CS4 (13-B2)
R331
33J
C385
OPEN
CPU3.3
Vss
P35/SCK1
P34/SCK0
P33/RxD1
P32/RxD0
P31/TxD1
P30/TxD0
VCC
PD7/D15
PD6/D14
PD5/D13
PD4/D12
Vss
PD3/D11
PD2/D10
PD1/D9
PD0/D8
PE7/D7
PE6/D6
PE5/D5
PE4/D4
Vss
PE3/D3
PE2/D2
PE1/D1
PE0/D0
VCC
P64/IRQ0
H8S/2321
LCDE (4-C1)
LCDRS (4-C1)
SCL
SDA
TXD1
POFF
TxD1 (11-B2)
POFF (5-B1)
BR14
33J
BR16
BR17
BR19
D[15..0] (2-A1) (3-A1) (4-A2) (13-C2)
Serial EE-PROM
C7
0.1u
IC3
VCC
WC
SCL
SDA
E0
E1
E2
VSS
24WC02
R14
10kJ
R17
OPEN
R15
1kJ
R16
1kJ
SCL (4-A1)
SDA1(4-B1)
ARB_INT (2-B1)
(FW) (4-D4) (8-A2)
CPU_SYNC (2-B1)
MT_HOME
mt_at_home(14-C3)
CCD_TG (2-A4) (14-D3)
(SPPD) (7-E1)
(PSW) (7-E1)
A20
A[19..0] (2-A1) (3-A3)
L1
ZJSR5101-223
CPU3.3
C8
10u/16V
C9
C10
C11
C12
C13
C14
0.1u
C
D
E
1
2
3
4

MCU PWB (ASIC section)



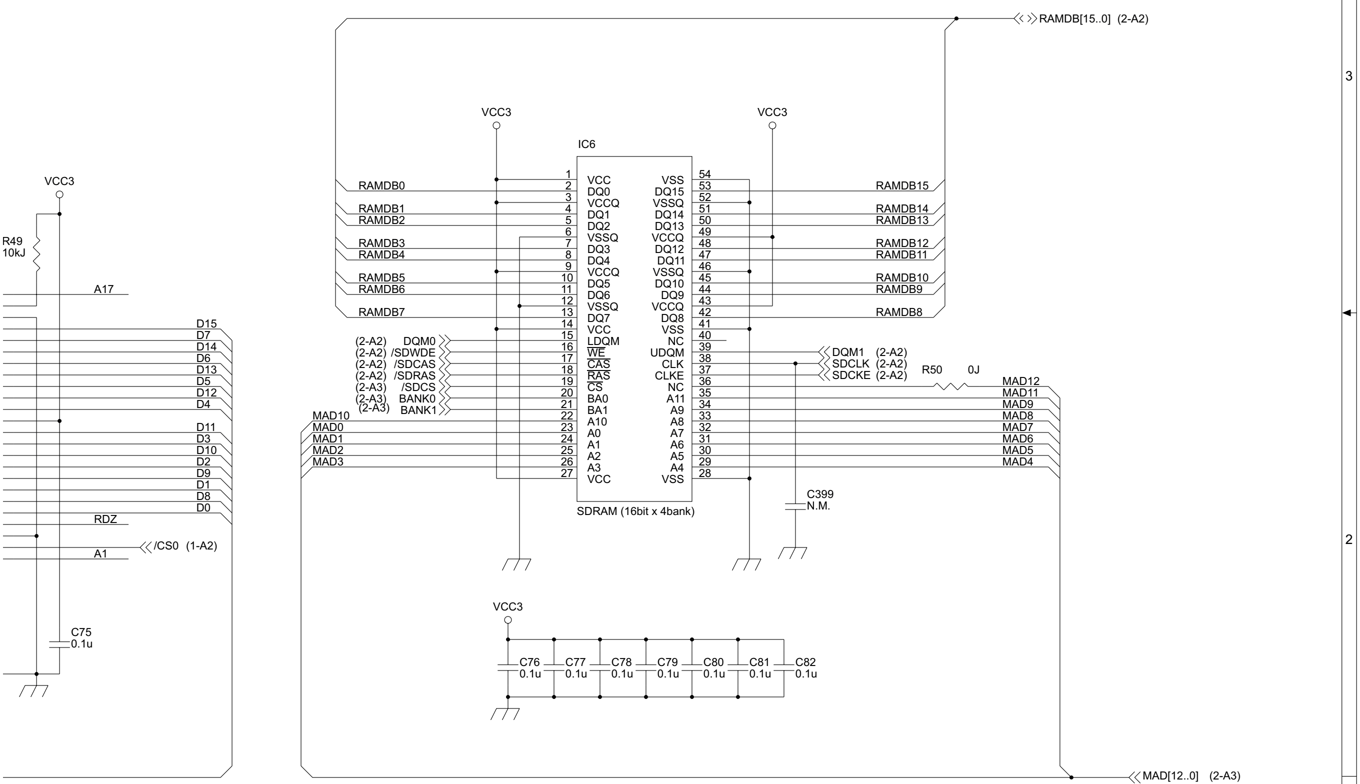


MCU PWB (Memory section)



Flash ROM

IC7	LH28F400BVE-BL85
R51	OPEN

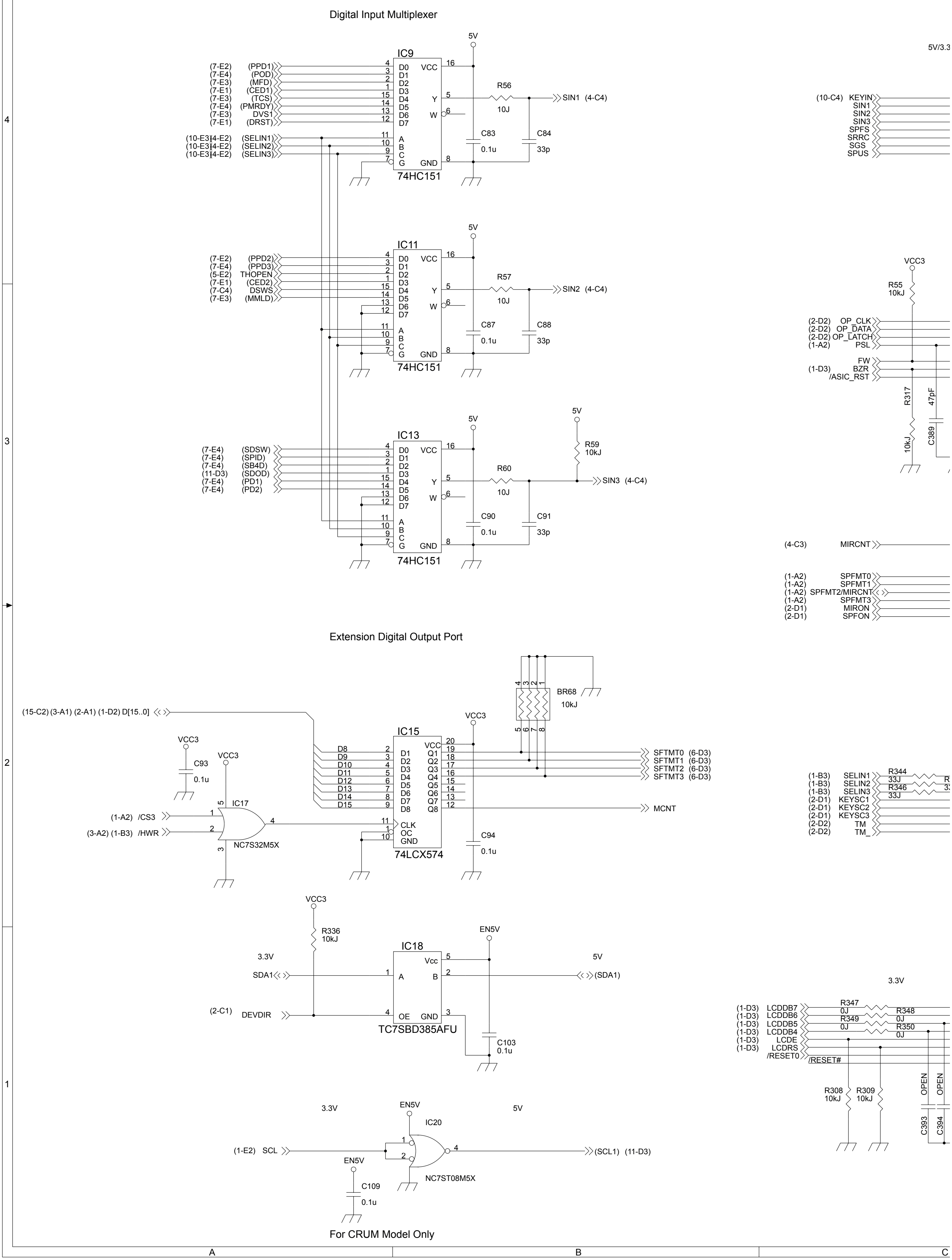


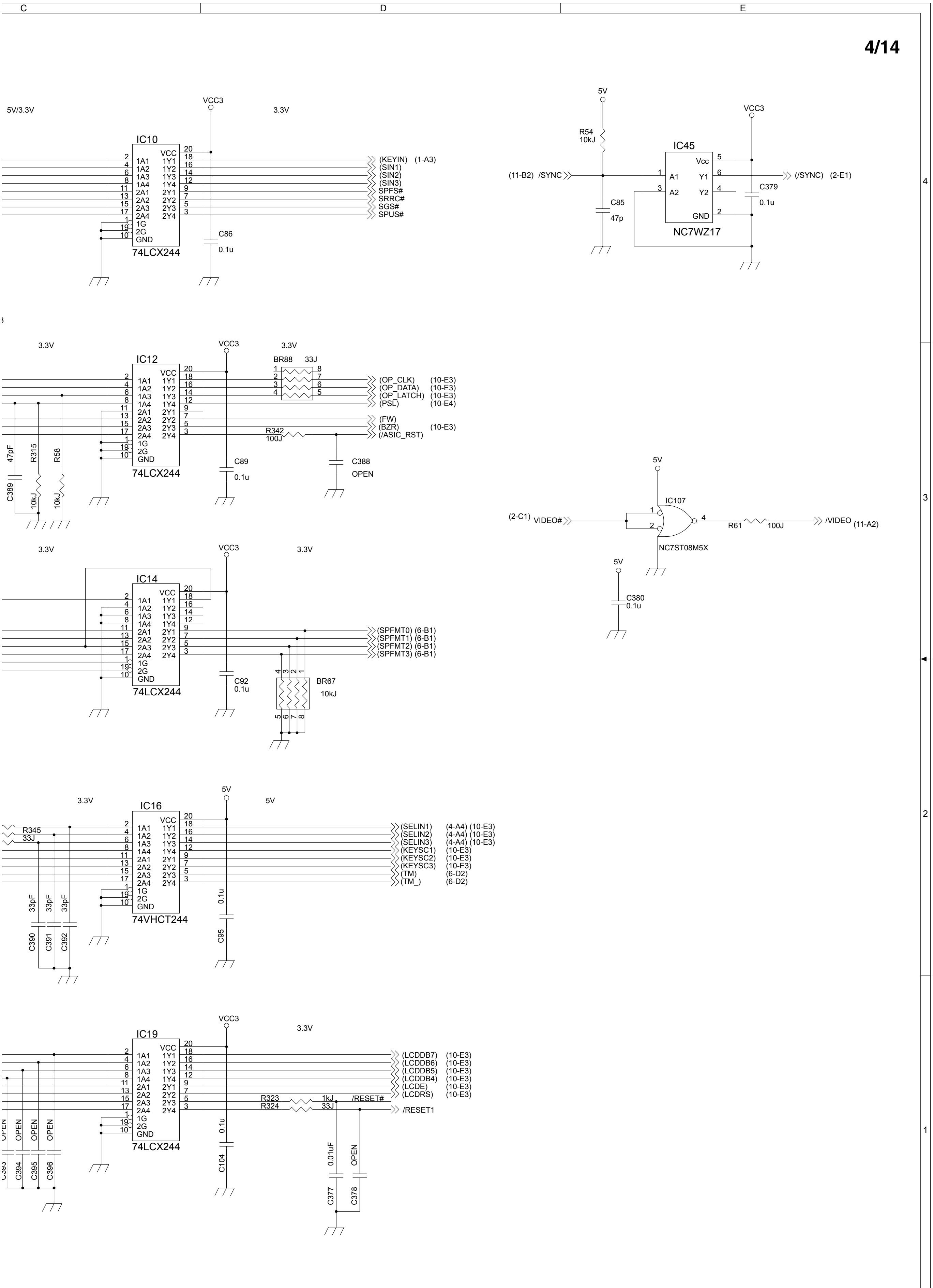
5	LH28F800BJE-PBTL90
	0J

IC6

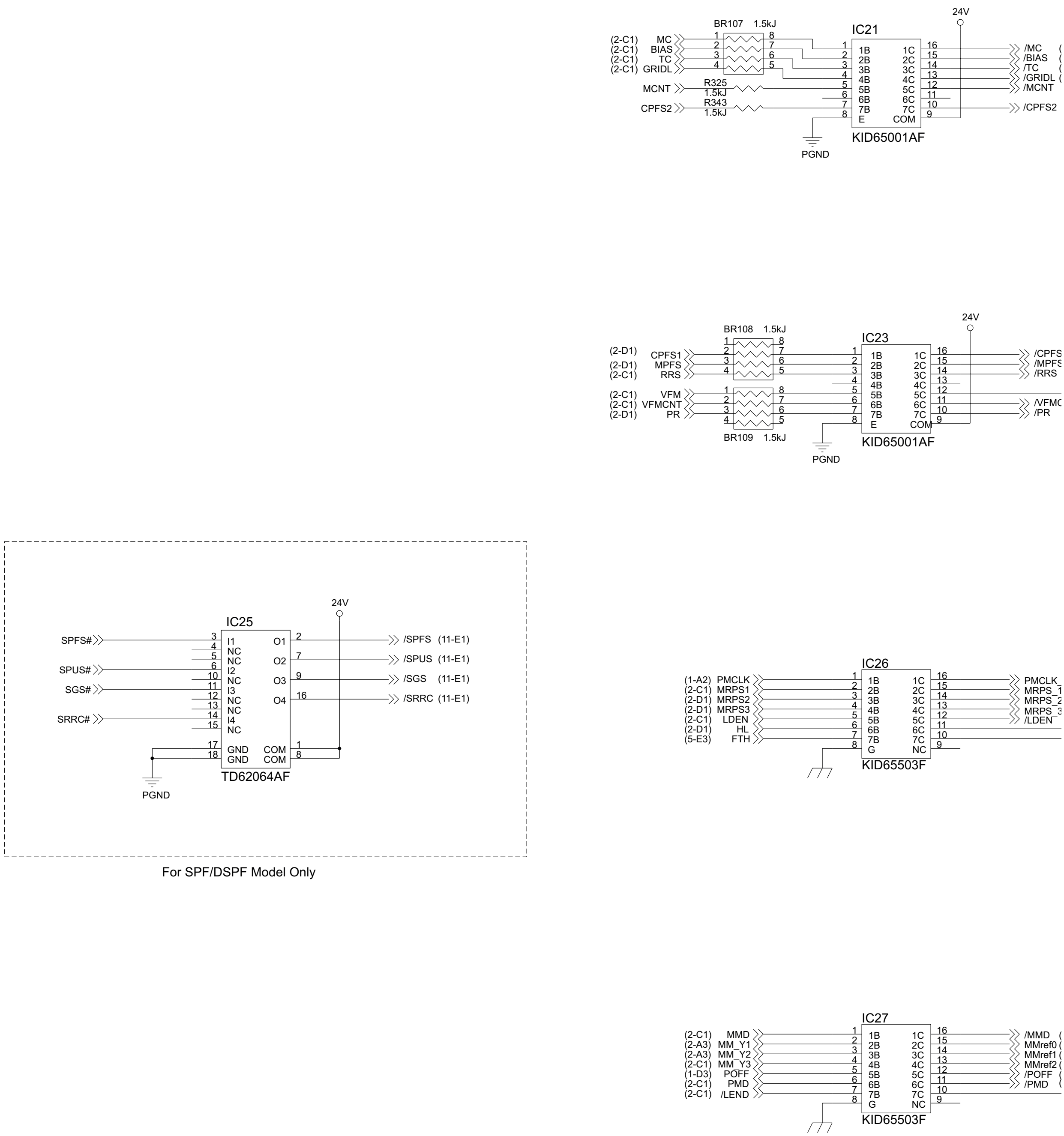
SDRAM	Vendor/Type
128Mb(2Mx16bitx4bank)	MT48LC8M16A2TG-75(Micron) HY57V281620HCT(Hyndai) K4S281632E-TC75(Samsung) W981216BH-75(Winbond)
64Mb(1Mx16bitx4bank)	HY57V641620HGT-P （ Hyndai) MT48LC4M16A2TG-75 （ Micron) K4S641632F-TC75(Samsung) K4S641632E-TC1H(Samsung) W986416DH-7(Winbond)

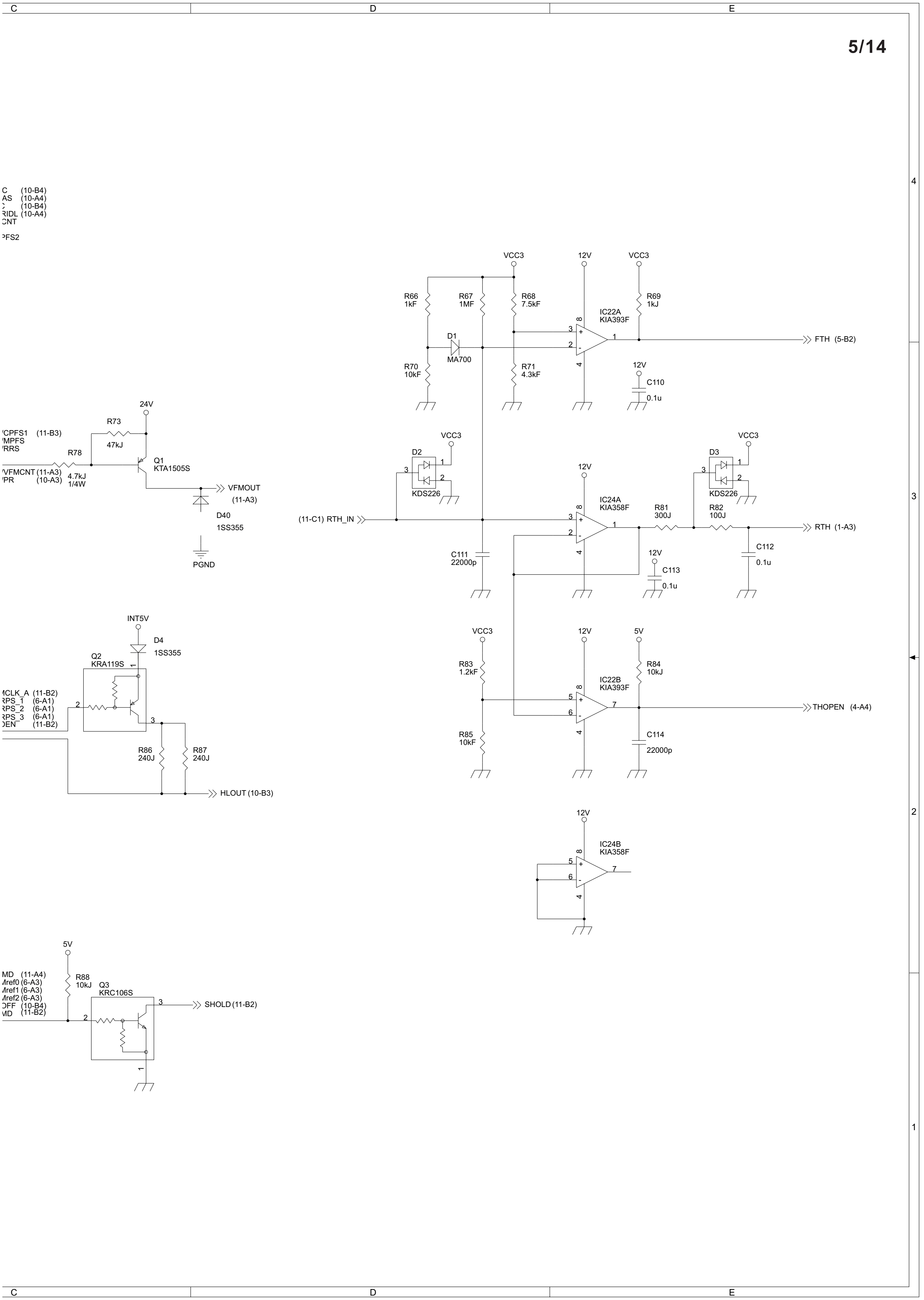
MCU PWB (Driver section 1)




C
D
E
5V/3.3V
VCC3
3.3V
IC10
74LCX244
C86
0.1u
(KEYIN) (1-A3)
(SIN1)
(SIN2)
(SIN3)
SPFS#
SRRC#
SGS#
SPUS#
5V
R54
10kJ
IC45
NC7WZ17
(11-B2) /SYNC
C85
47p
VCC3
C379
0.1u
(/SYNC) (2-E1)
IC12
74LCX244
BR88 33J
(OP_CLK) (10-E3)
(OP_DATA) (10-E3)
(OP_LATCH) (10-E3)
(PSL) (10-E4)
(FW)
(BZR) (10-E3)
(/ASIC_RST)
R342
100J
C388
OPEN
C89
0.1u
C389
47pF
R315
10kJ
R58
10kJ
IC107
NC7ST08M5X
(2-C1) VIDEO#
R61
100J
/VIDEO (11-A2)
C380
0.1u
IC14
74LCX244
(SPFMT0) (6-B1)
(SPFMT1) (6-B1)
(SPFMT2) (6-B1)
(SPFMT3) (6-B1)
BR67
10kJ
C92
0.1u
IC16
74VHCT244
R345
33J
(SELIN1) (4-A4) (10-E3)
(SELIN2) (4-A4) (10-E3)
(SELIN3) (4-A4) (10-E3)
(KEYSC1) (10-E3)
(KEYSC2) (10-E3)
(KEYSC3) (10-E3)
(TM) (6-D2)
(TM_) (6-D2)
C390 C391 C392
33pF
C95
0.1u
IC19
74LCX244
(LCDDB7) (10-E3)
(LCDDB6) (10-E3)
(LCDDB5) (10-E3)
(LCDDB4) (10-E3)
(LCDE) (10-E3)
(LCDRS) (10-E3)
R323 1kJ /RESET#
R324 33J
/RESET1
C394 C395 C396
OPEN
C104
0.1u
C377
0.01uF
C378
OPEN
4
3
2
1

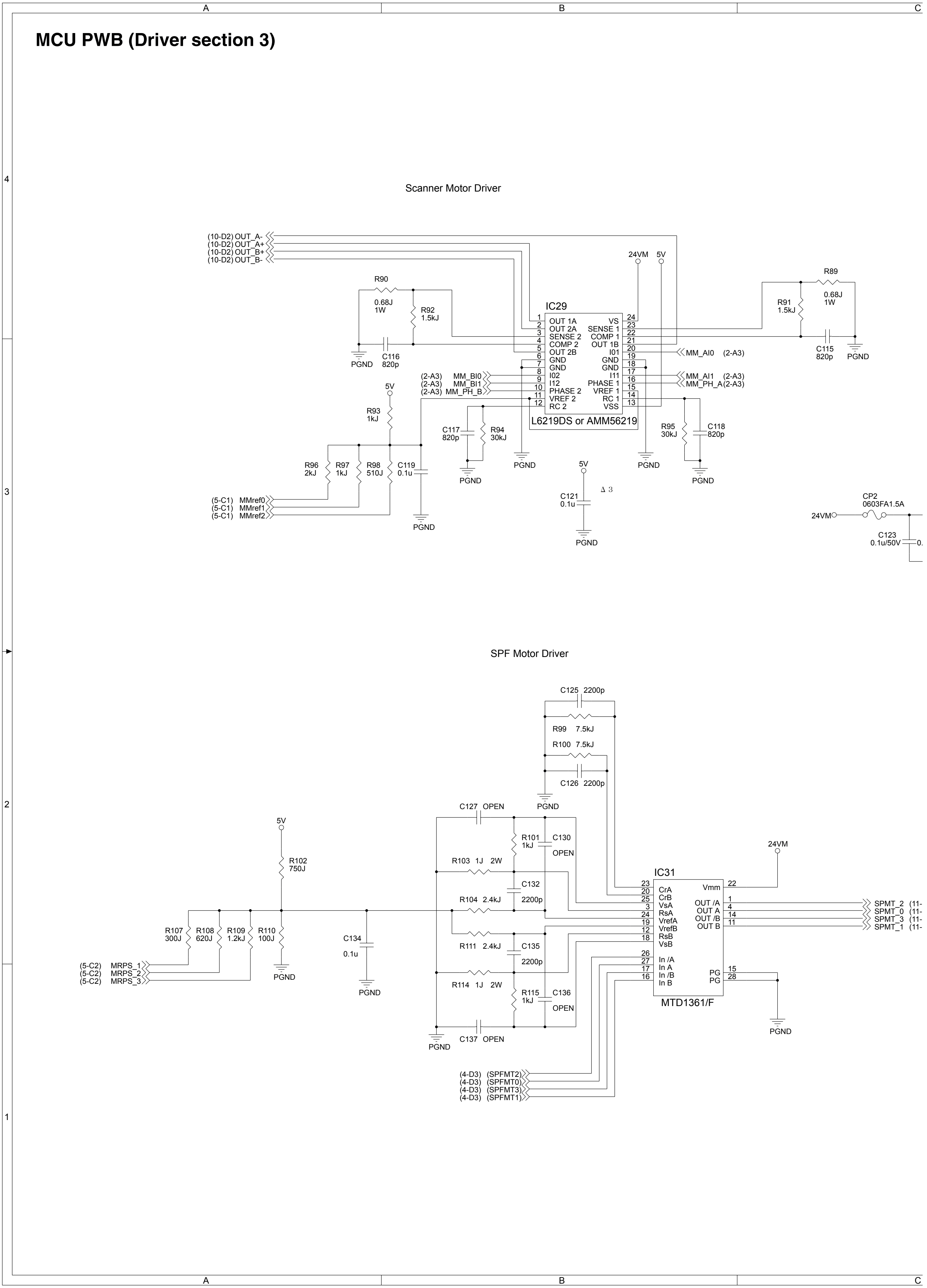
MCU PWB (Driver section 2)

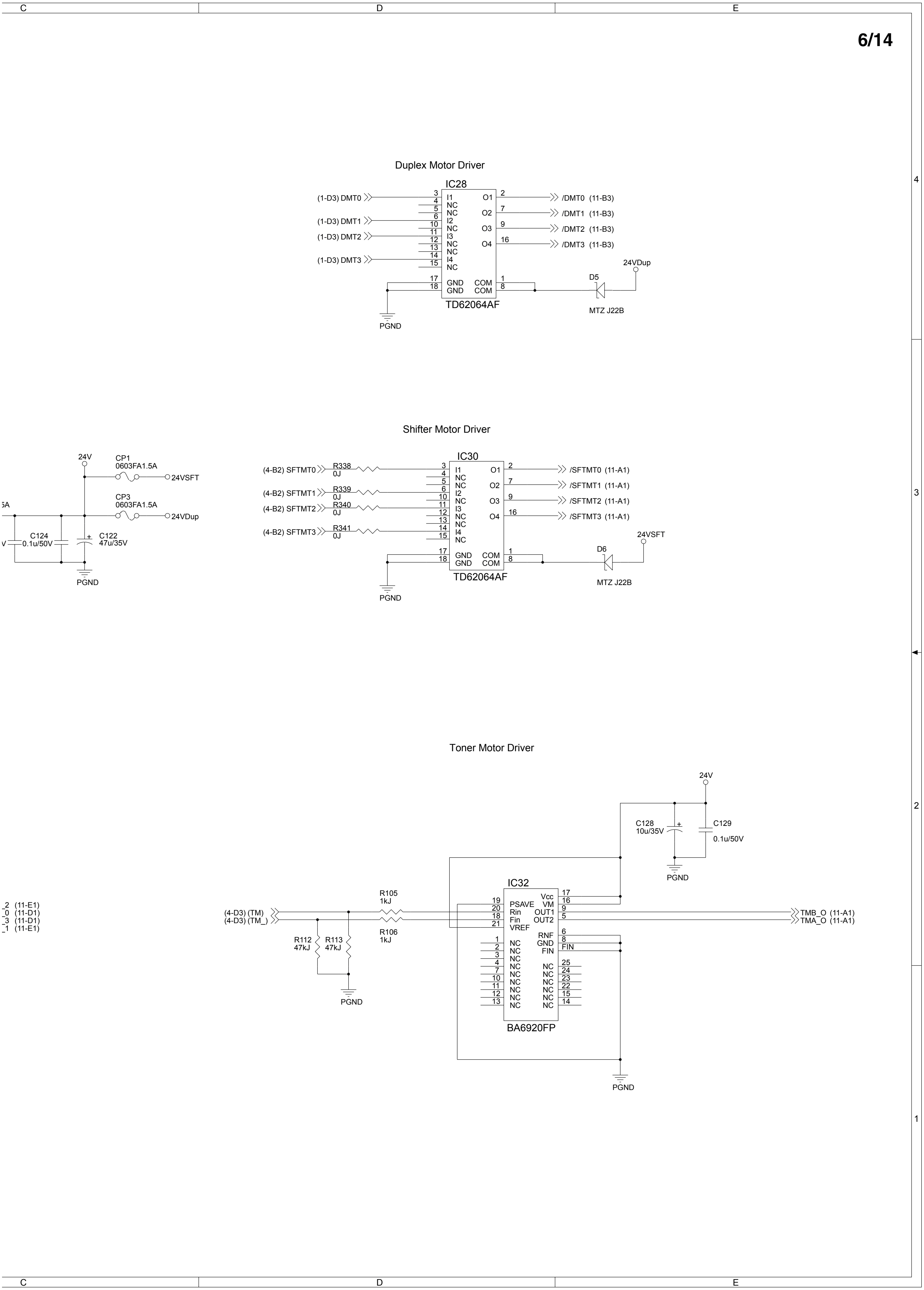




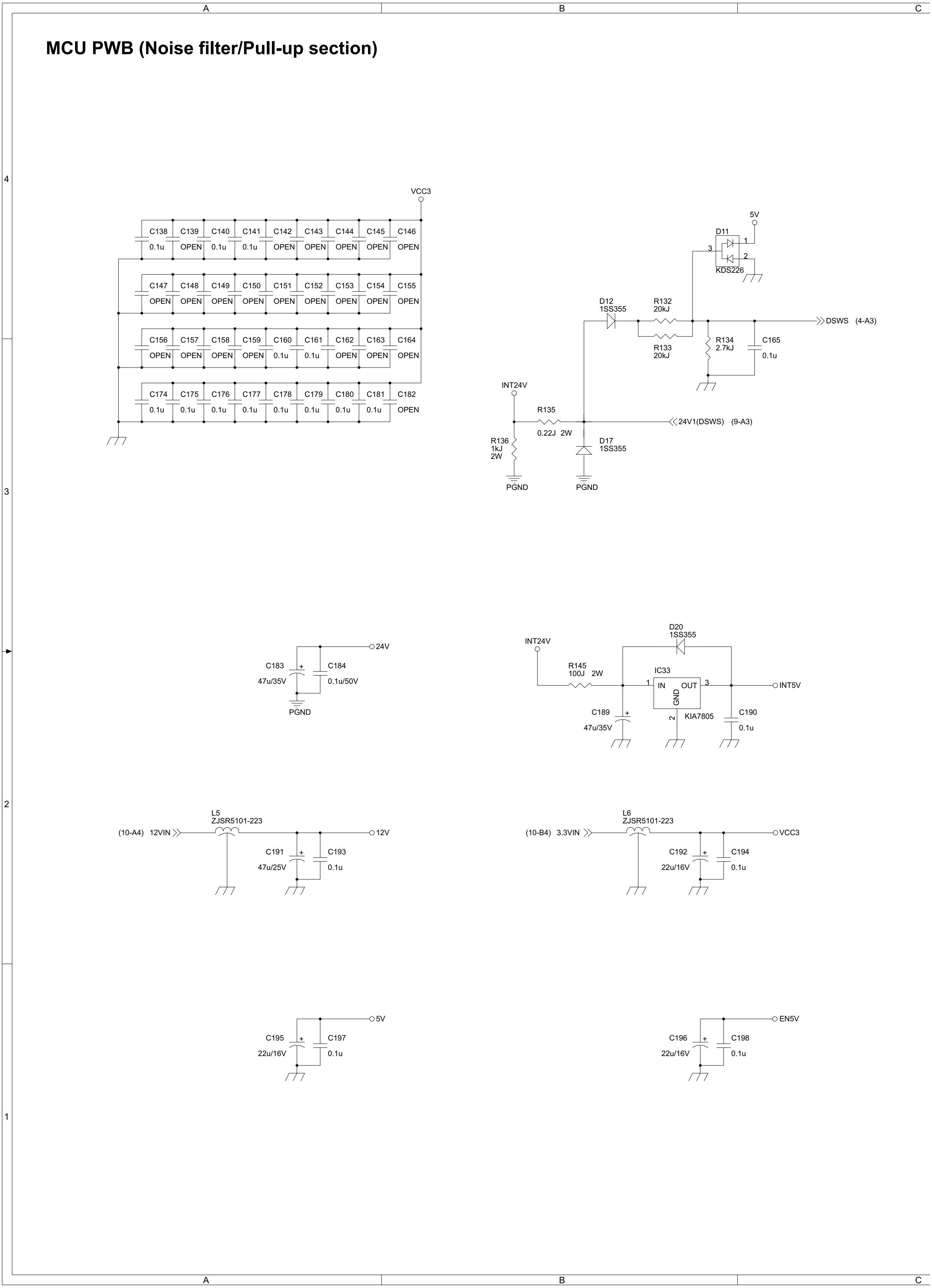
C
D
E
4
3
2
1
C (10-B4)
AS (10-A4)
C (10-B4)
RIDL (10-A4)
CNT
PFS2
VCC3
12V
VCC3
R66
1kF
R67
1MF
R68
7.5kF
R69
1kJ
IC22A
KIA393F
D1
MA700
FTH (5-B2)
R70
10kF
R71
4.3kF
12V
C110
0.1u
24V
R73
47kJ
VCPFS1 (11-B3)
VMPFS
VRRS
R78
Q1
KTA1505S
VFMCNT (11-A3)
VPR (10-A3)
4.7kJ
1/4W
VFMOUT
(11-A3)
D40
1SS355
PGND
VCC3
D2
KDS226
12V
IC24A
KIA358F
R81
300J
R82
100J
VCC3
D3
KDS226
(11-C1) RTH_IN
RTH (1-A3)
C111
22000p
12V
C113
0.1u
C112
0.1u
INT5V
D4
1SS355
Q2
KRA119S
MCLK_A (11-B2)
RPS_1 (6-A1)
RPS_2 (6-A1)
RPS_3 (6-A1)
DEN (11-B2)
R86
240J
R87
240J
HLOUT (10-B3)
VCC3
12V
5V
R83
1.2kF
R84
10kJ
IC22B
KIA393F
THOPEN (4-A4)
R85
10kF
C114
22000p
12V
IC24B
KIA358F
5V
R88
10kJ
Q3
KRC106S
MD (11-A4)
Mref0 (6-A3)
Mref1 (6-A3)
Mref2 (6-A3)
OFF (10-B4)
MD (11-B2)
SHOLD (11-B2)

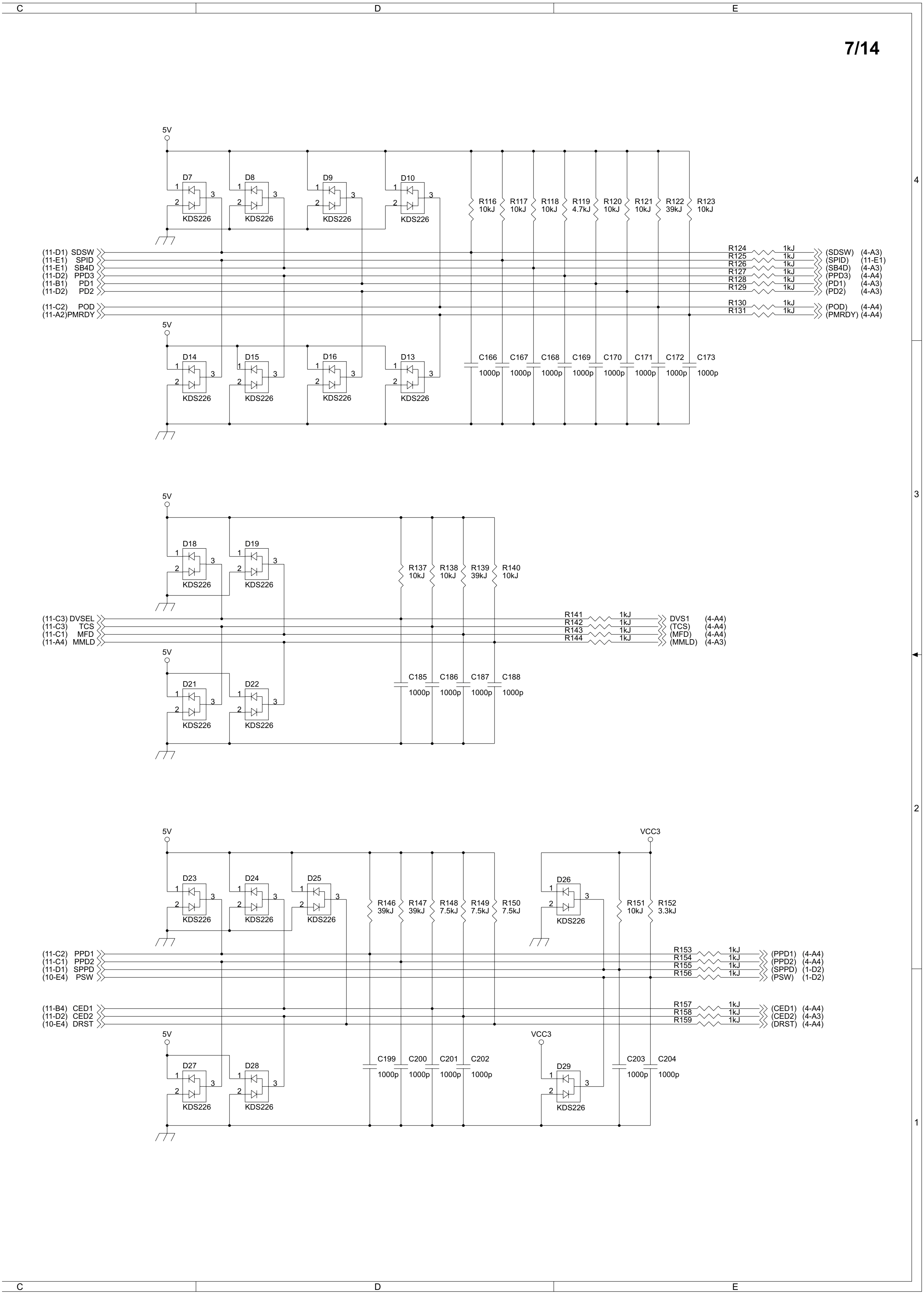
MCU PWB (Driver section 3)



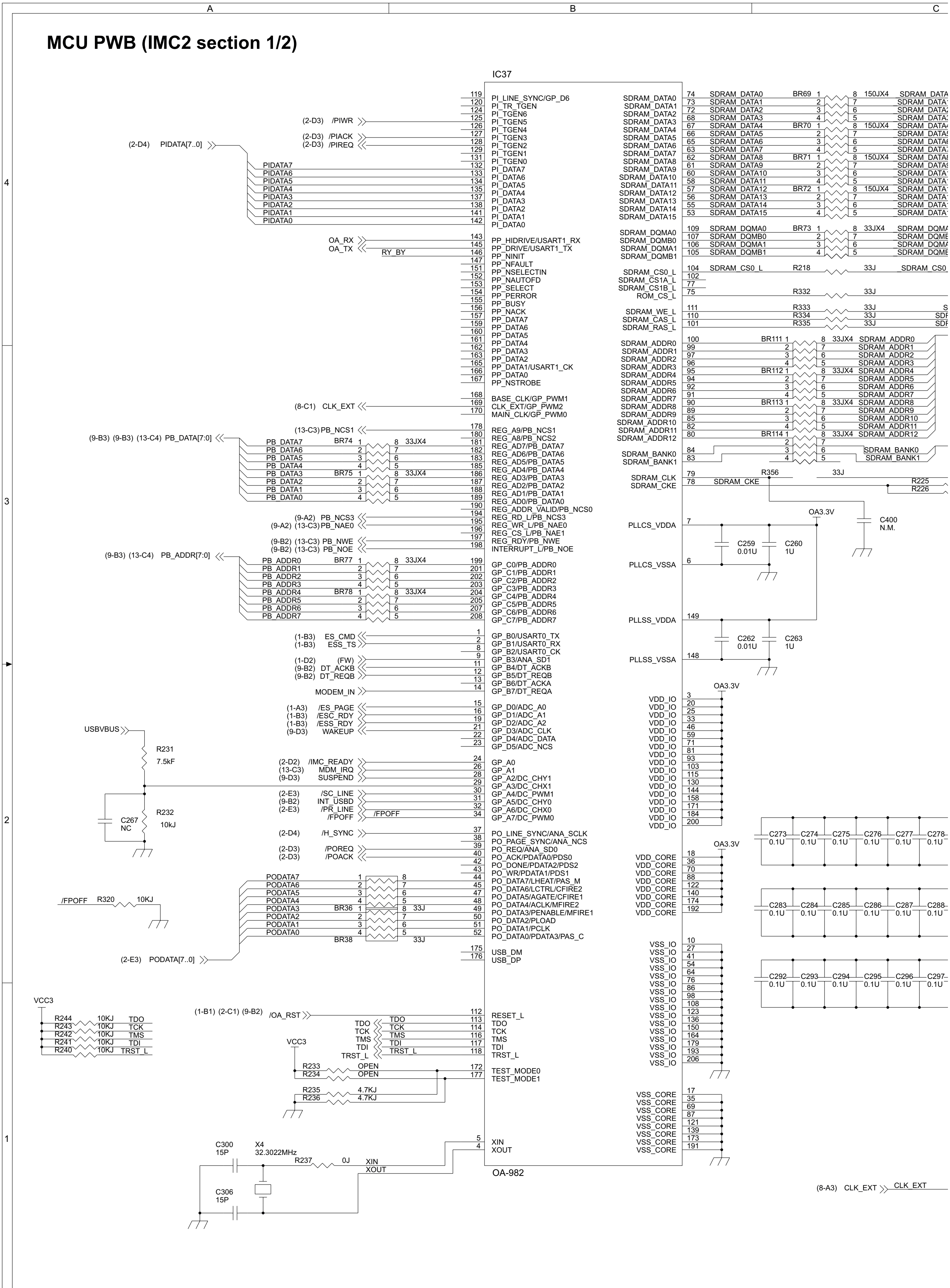

Duplex Motor Driver
IC28
(1-D3) DMT0
(1-D3) DMT1
(1-D3) DMT2
(1-D3) DMT3
I1 NC NC I2 NC I3 NC NC I4 NC GND GND
O1 O2 O3 O4 COM COM
/DMT0 (11-B3)
/DMT1 (11-B3)
/DMT2 (11-B3)
/DMT3 (11-B3)
24VDup
D5
MTZ J22B
TD62064AF
PGND
Shifter Motor Driver
24V
CP1
0603FA1.5A
24VSFT
CP3
0603FA1.5A
24VDup
C124
0.1u/50V
C122
47u/35V
PGND
IC30
(4-B2) SFTMT0
(4-B2) SFTMT1
(4-B2) SFTMT2
(4-B2) SFTMT3
R338 0J
R339 0J
R340 0J
R341 0J
/SFTMT0 (11-A1)
/SFTMT1 (11-A1)
/SFTMT2 (11-A1)
/SFTMT3 (11-A1)
24VSFT
D6
MTZ J22B
TD62064AF
PGND
Toner Motor Driver
24V
C128
10u/35V
C129
0.1u/50V
PGND
IC32
(4-D3) (TM)
(4-D3) (TM_)
R105 1kJ
R106 1kJ
R112 47kJ
R113 47kJ
PGND
PSAVE Rin Fin VREF
Vcc VM OUT1 OUT2
RNF GND FIN
TMB_O (11-A1)
TMA_O (11-A1)
BA6920FP
PGND
_2 (11-E1)
_0 (11-D1)
_3 (11-D1)
_1 (11-E1)
C D E
4 3 2 1

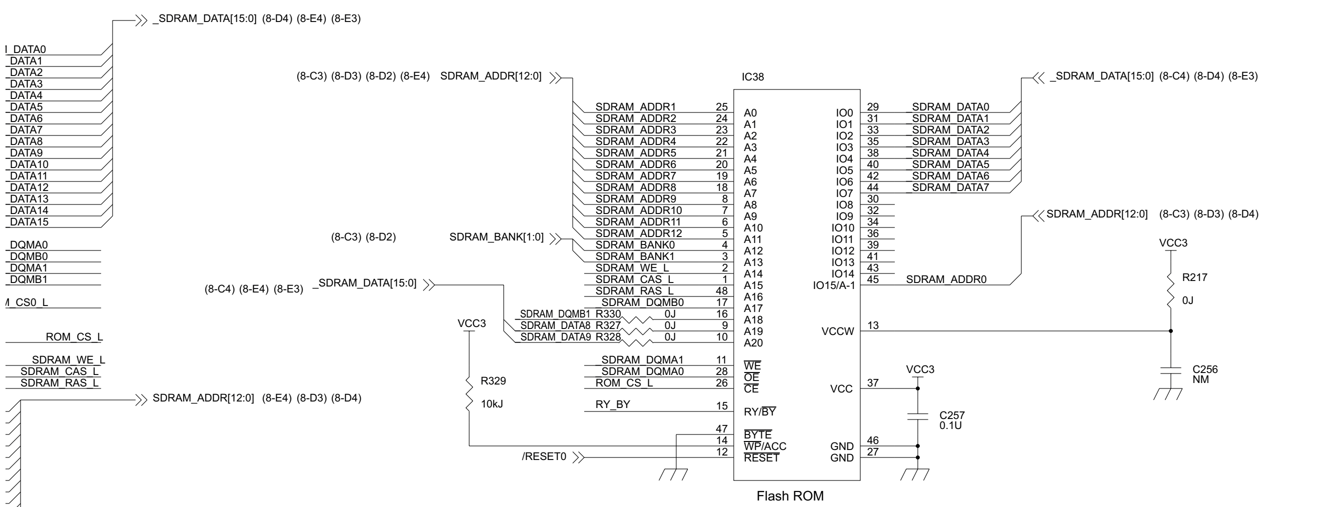
MCU PWB (Noise filter/Pull-up section)





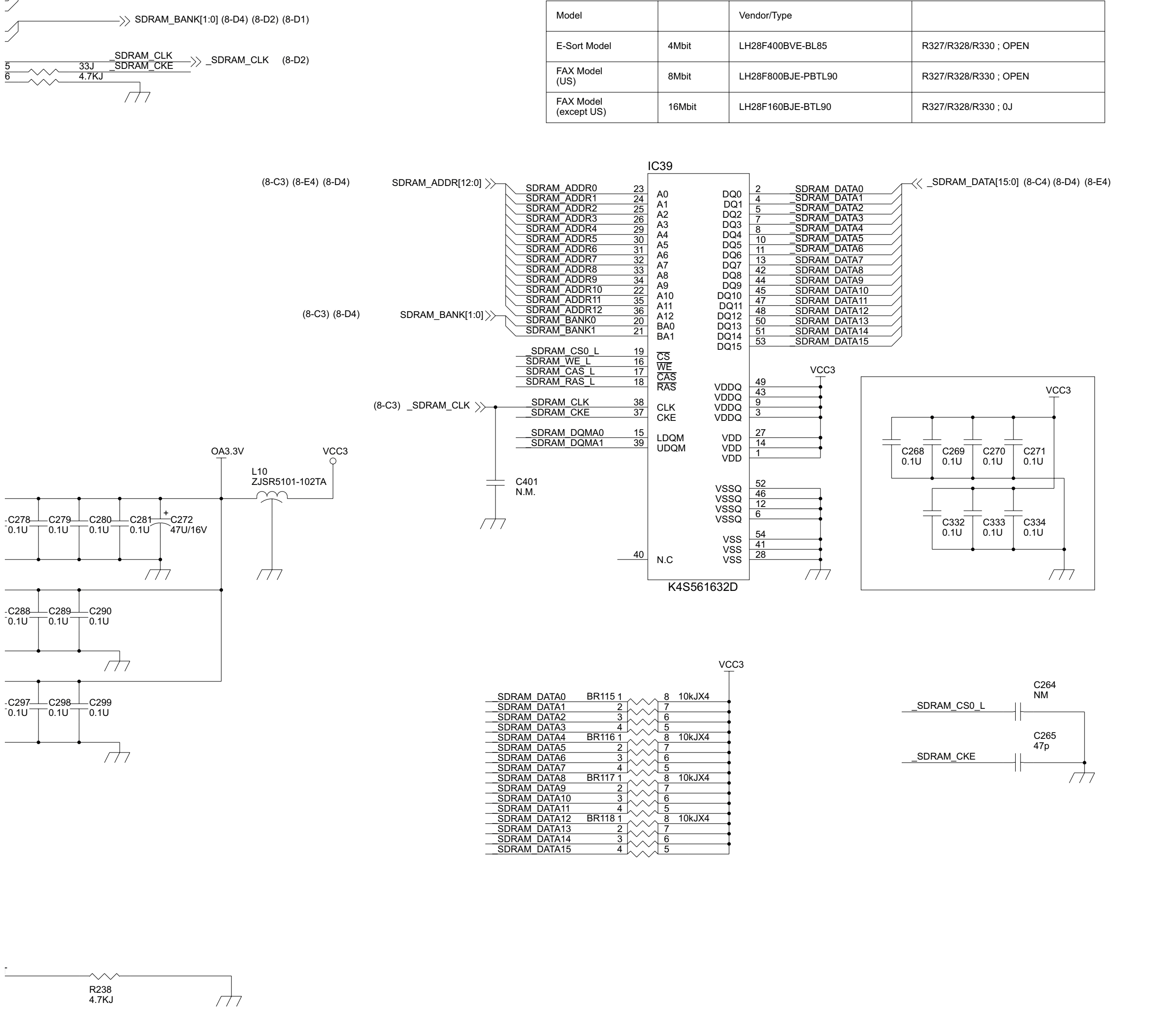
MCU PWB (IMC2 section 1/2)



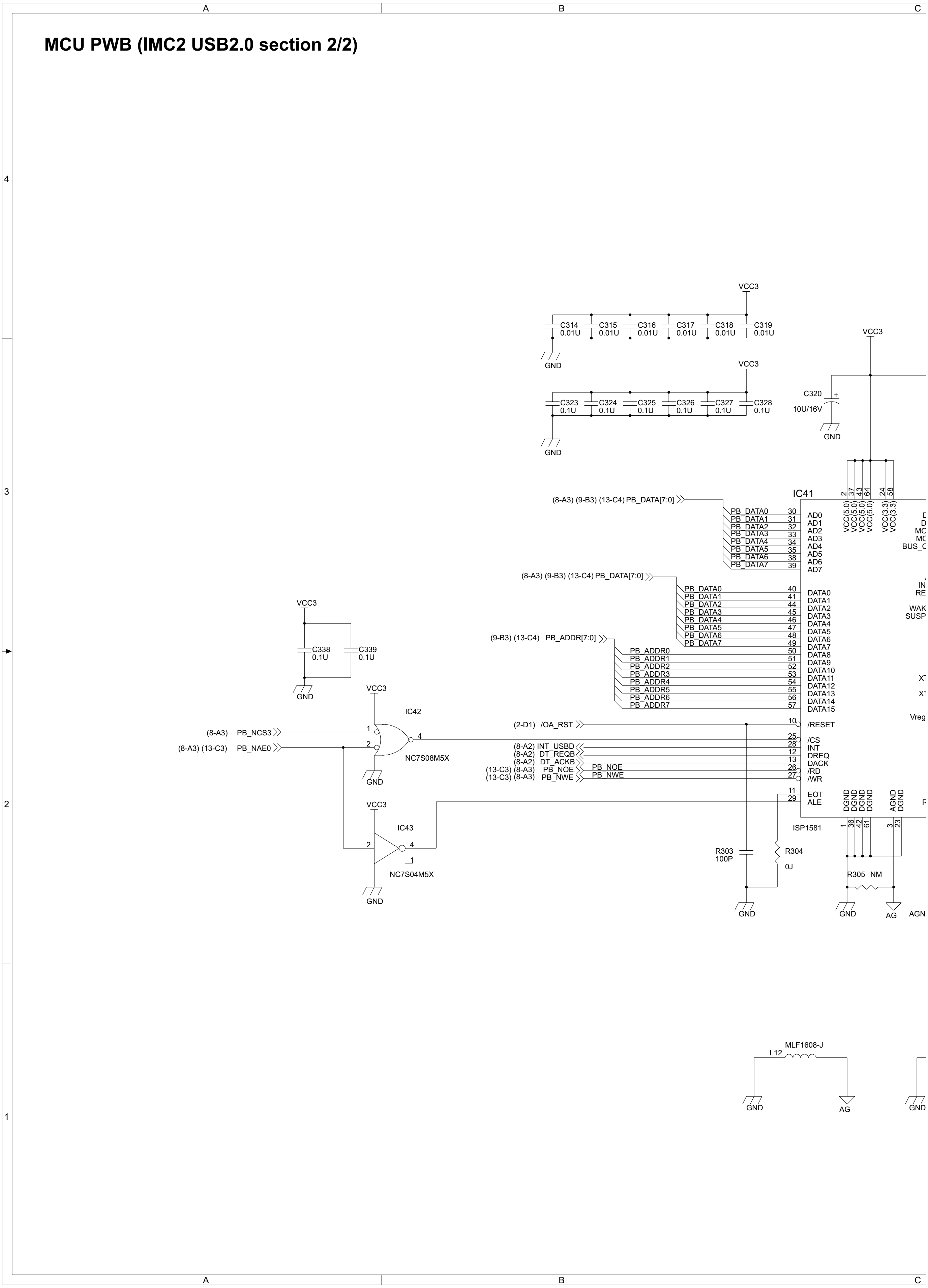


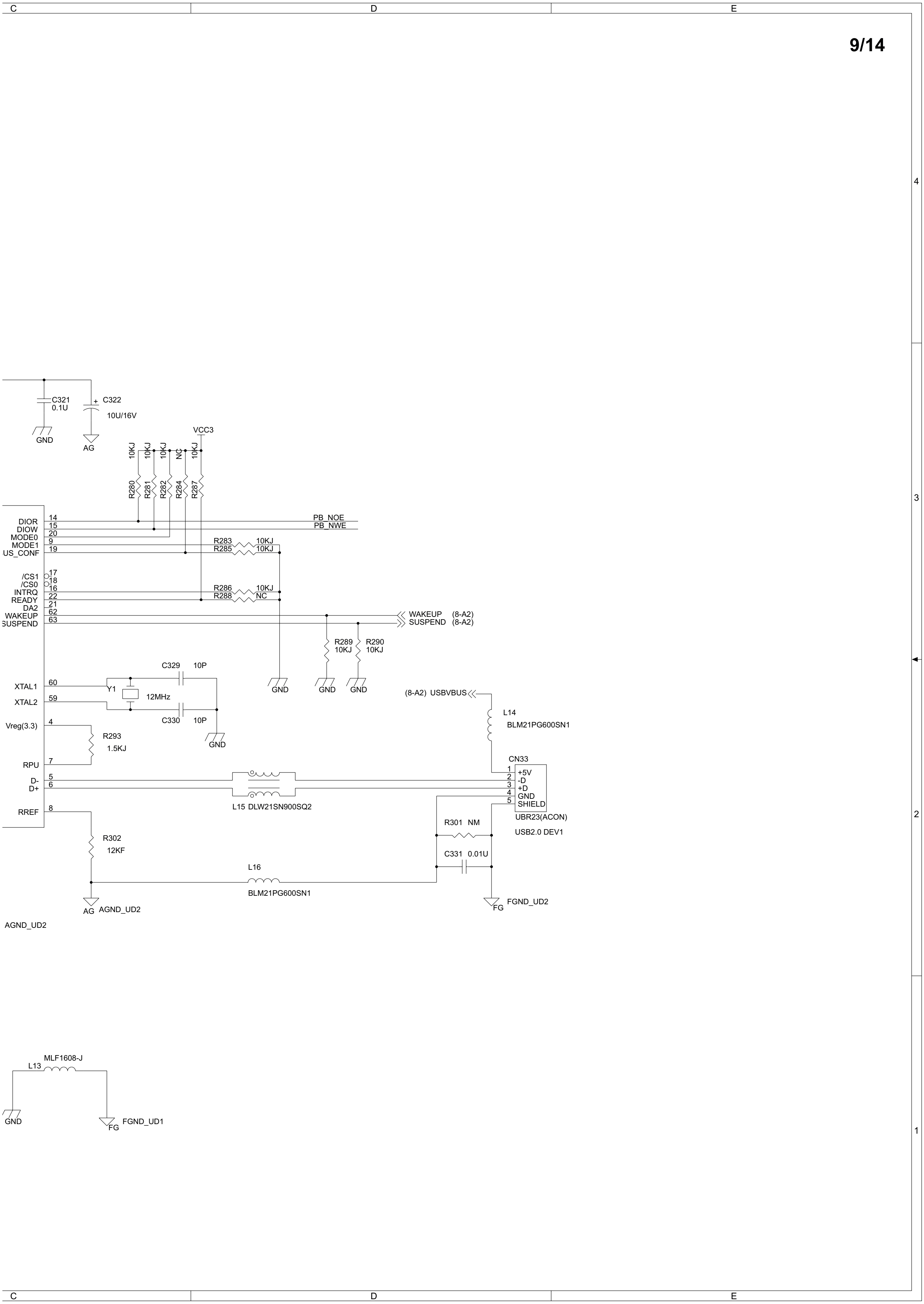
Flash ROM

Model		Vendor/Type	
E-Sort Model	4Mbit	LH28F400BVE-BL85	R327/R328/R330 ; OPEN
FAX Model (US)	8Mbit	LH28F800BJE-PBTL90	R327/R328/R330 ; OPEN
FAX Model (except US)	16Mbit	LH28F160BJE-BTL90	R327/R328/R330 ; 0J

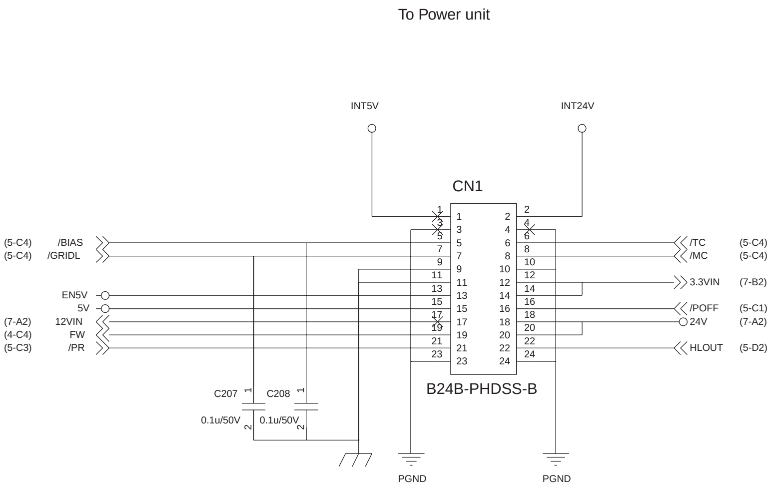


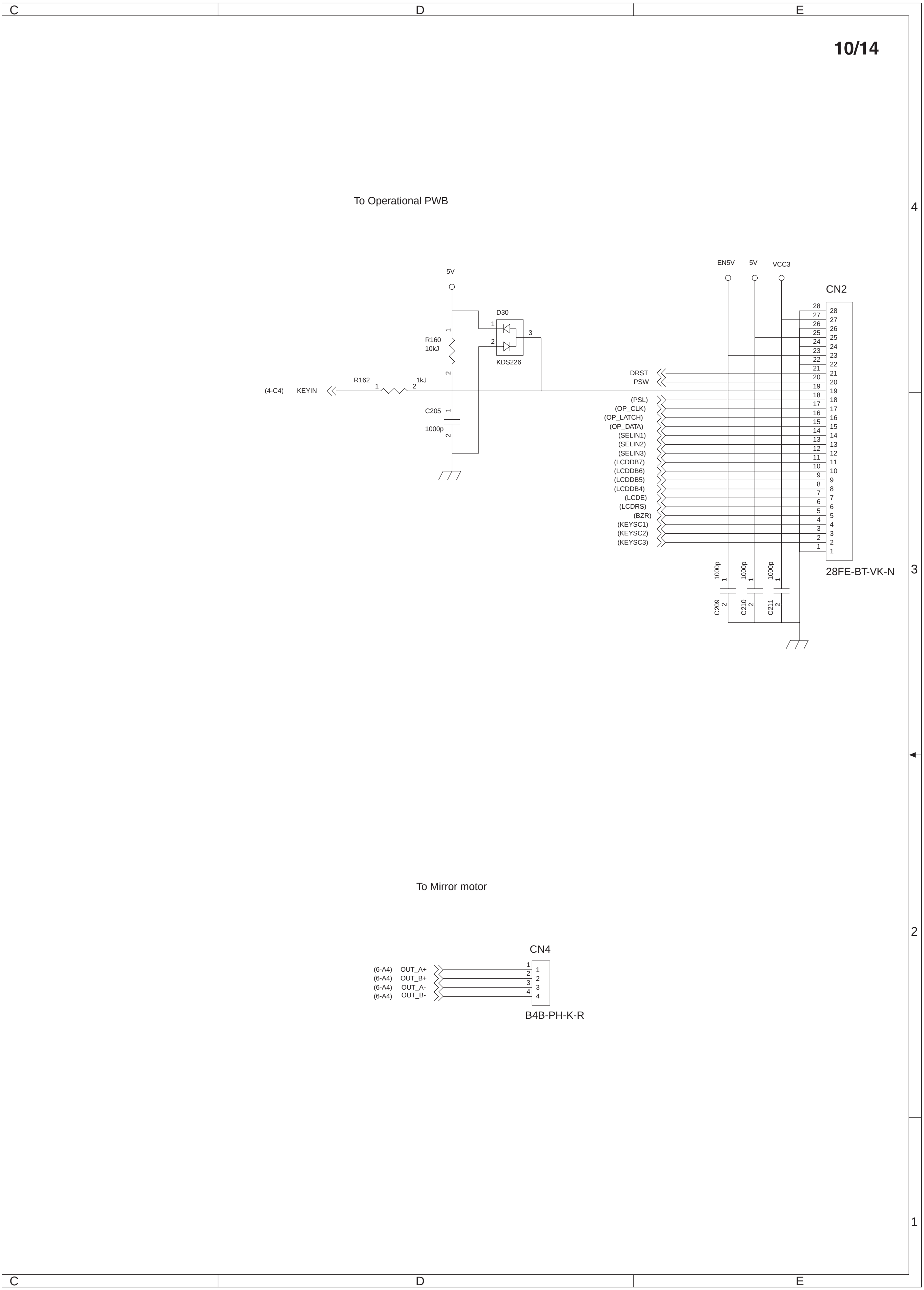
MCU PWB (IMC2 USB2.0 section 2/2)




C321 0.1U
C322 10U/16V
GND
AG
VCC3
R280 10KJ
R281 10KJ
R282 10KJ
R284 NC
R287 10KJ
DIOR 14
DIOW 15
MODE0 20
MODE1 9
US_CONF 19
/CS1 17
/CS0 18
INTRQ 16
READY 22
DA2 21
WAKEUP 62
SUSPEND 63
PB_NOE
PB_NWE
R283 10KJ
R285 10KJ
R286 10KJ
R288 NC
WAKEUP (8-A2)
SUSPEND (8-A2)
R289 10KJ
R290 10KJ
XTAL1 60
XTAL2 59
Y1 12MHz
C329 10P
C330 10P
Vreg(3.3) 4
R293 1.5KJ
RPU 7
D- 5
D+ 6
RREF 8
(8-A2) USBVBUS
L14 BLM21PG600SN1
CN33
1 +5V
2 -D
3 +D
4 GND
5 SHIELD
UBR23(ACON)
USB2.0 DEV1
L15 DLW21SN900SQ2
R301 NM
C331 0.01U
R302 12KF
L16 BLM21PG600SN1
AG AGND_UD2
FG FGND_UD2
AGND_UD2
L13 MLF1608-J
GND
FG FGND_UD1
C
D
E
4
3
2
1

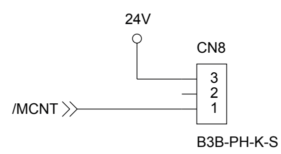
MCU PWB (Connector section 1)

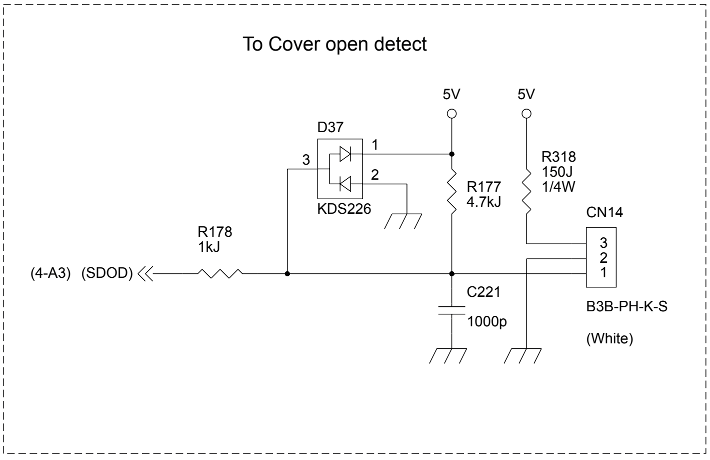




To Operational PWB
5V
D30
KDS226
R160
10kJ
R162
1kJ
(4-C4) KEYIN
C205
1000p
EN5V
5V
VCC3
CN2
DRST
PSW
(PSL)
(OP_CLK)
(OP_LATCH)
(OP_DATA)
(SELIN1)
(SELIN2)
(SELIN3)
(LCDDB7)
(LCDDB6)
(LCDDB5)
(LCDDB4)
(LCDE)
(LCDRS)
(BZR)
(KEYSC1)
(KEYSC2)
(KEYSC3)
28FE-BT-VK-N
C209
C210
C211
1000p
To Mirror motor
CN4
(6-A4) OUT_A+
(6-A4) OUT_B+
(6-A4) OUT_A-
(6-A4) OUT_B-
B4B-PH-K-R

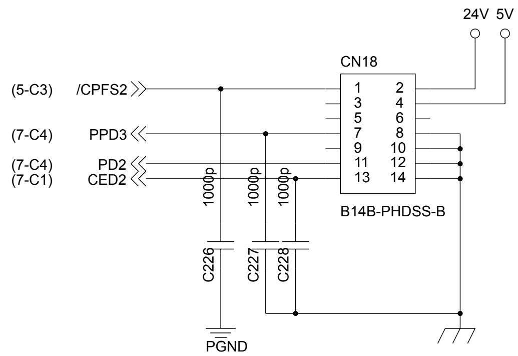
MCU PWB (Connector section 3)





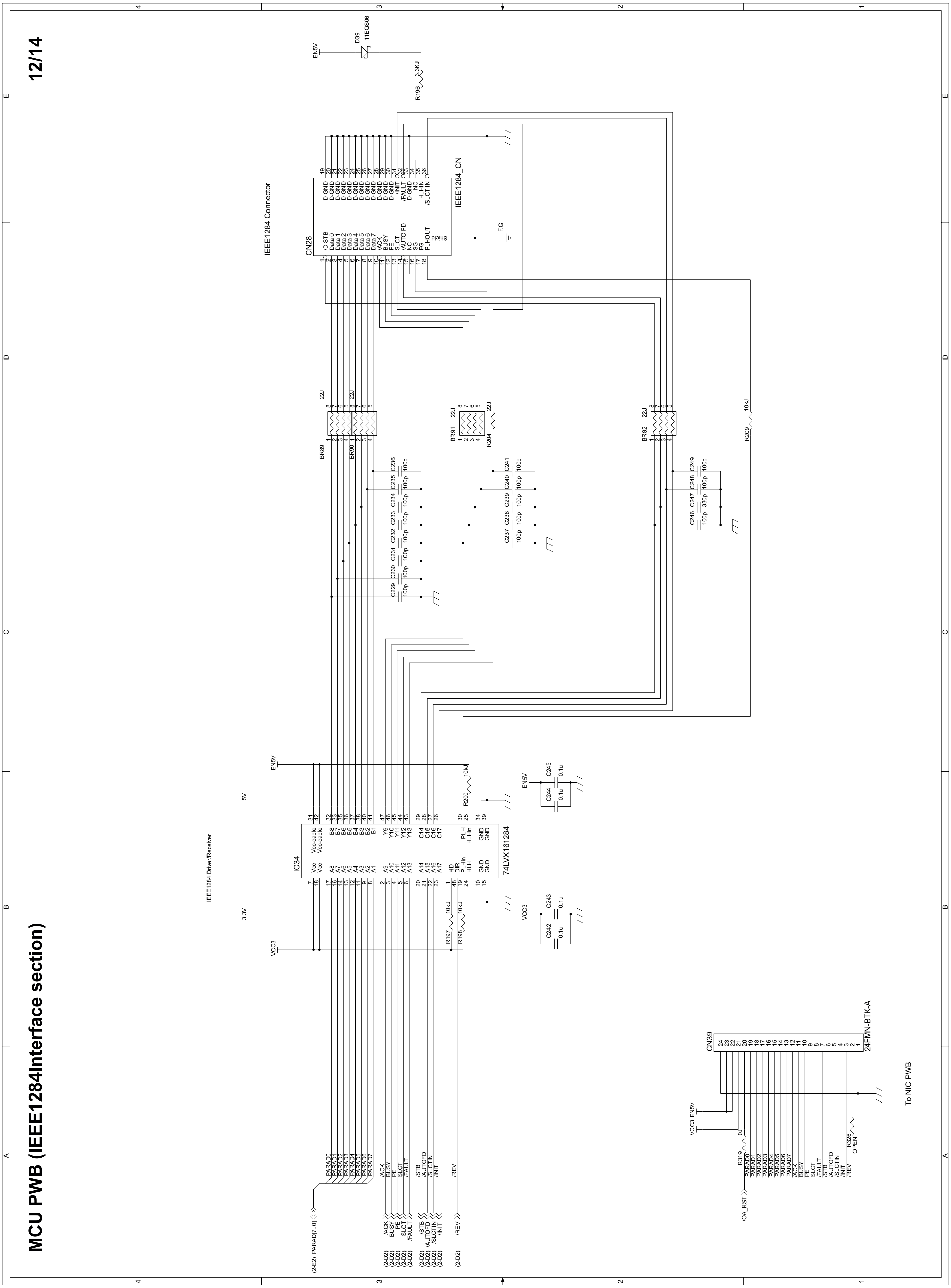
For SPF/DSPF Model Only

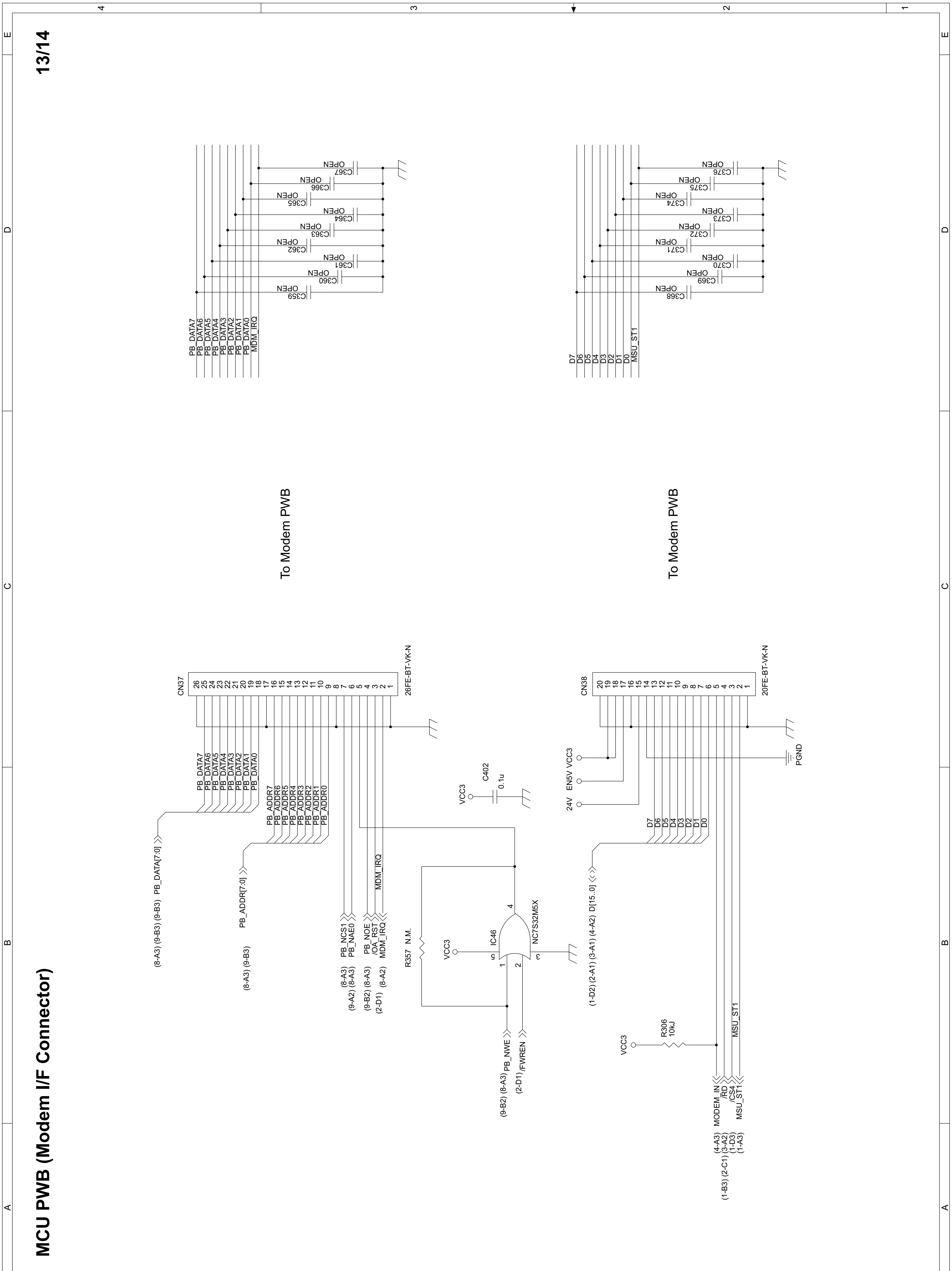
To 2nd. cassette



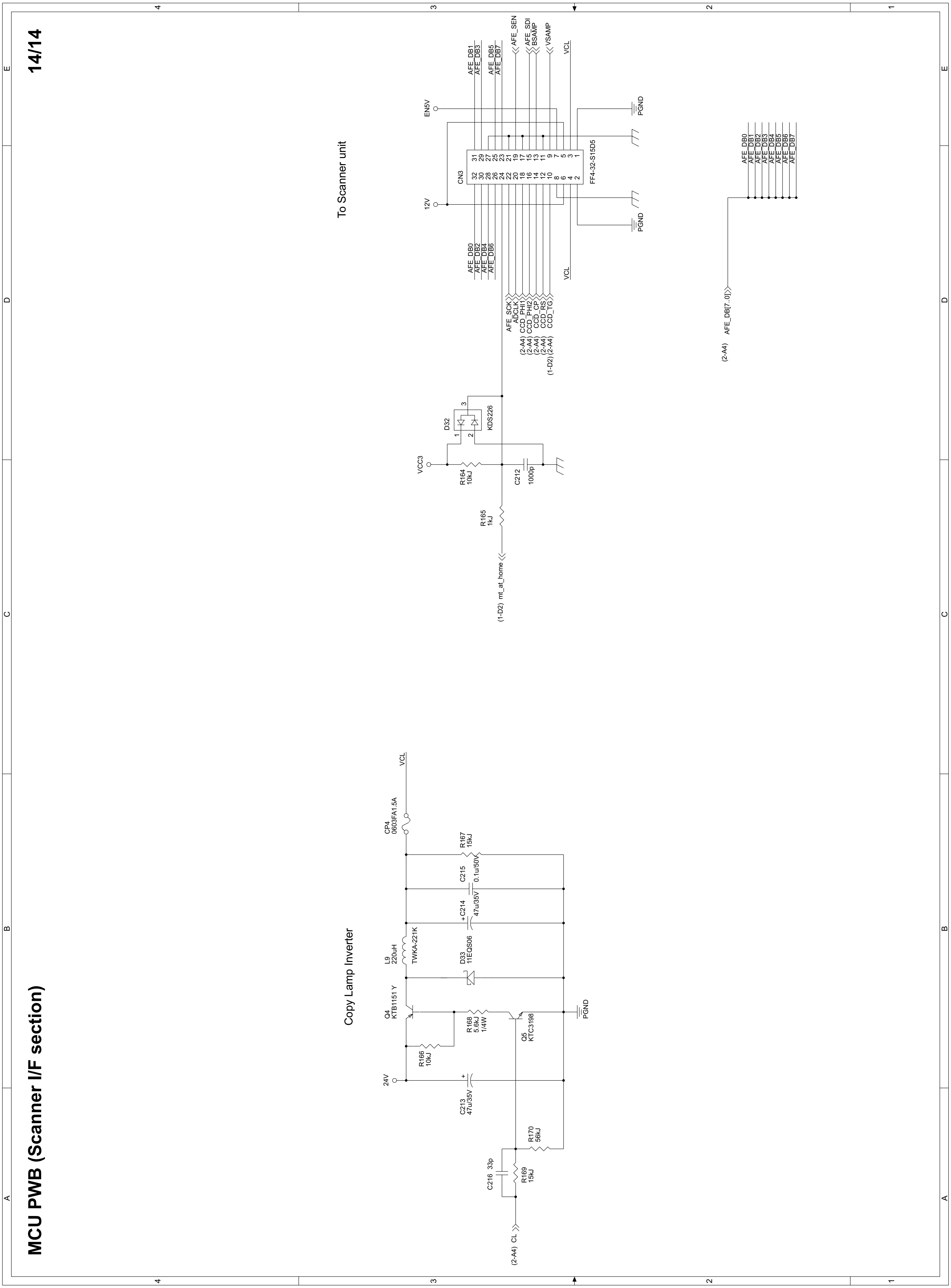
MCU PWB (IEEE1284Interface section)

12/14

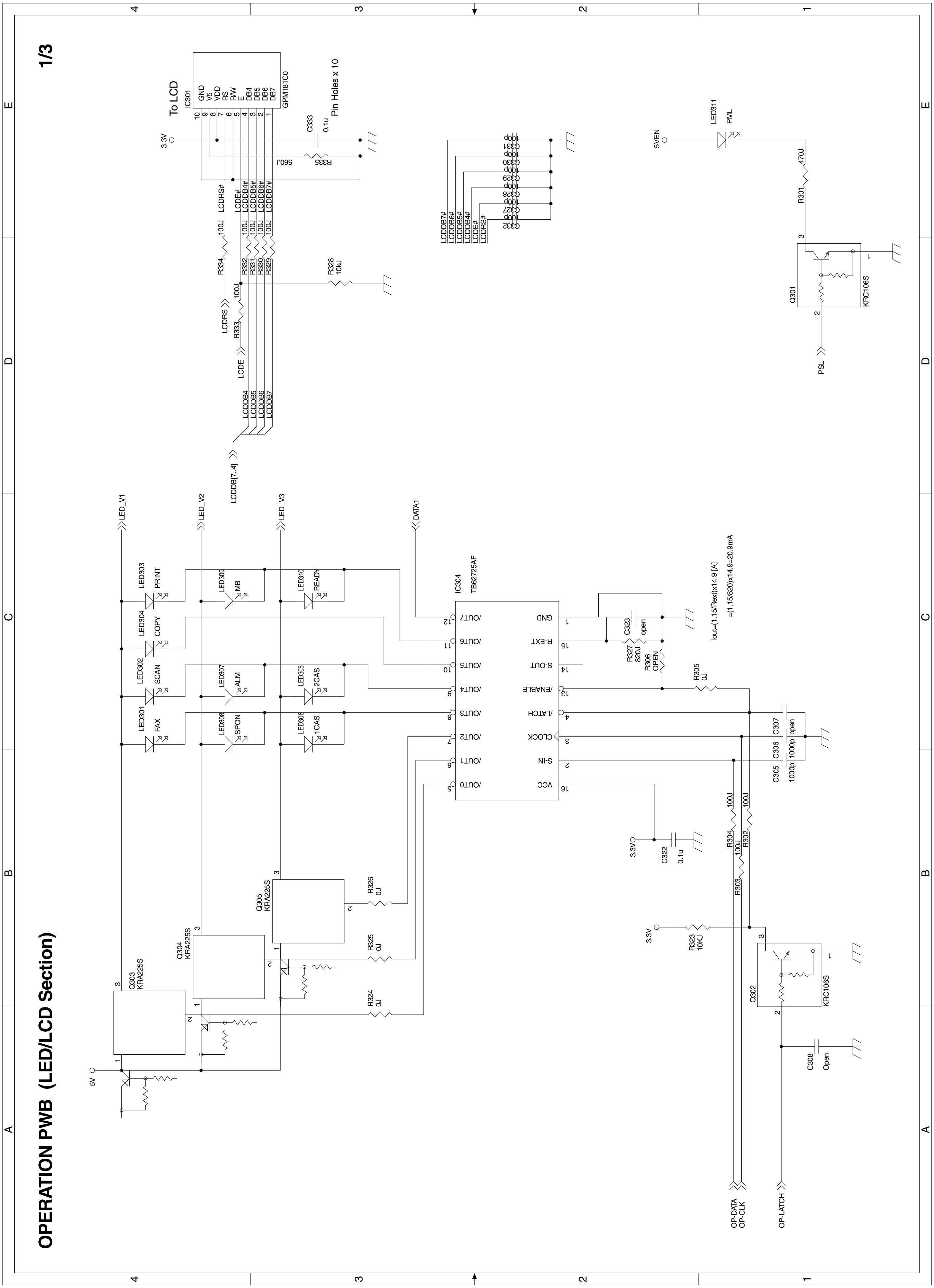


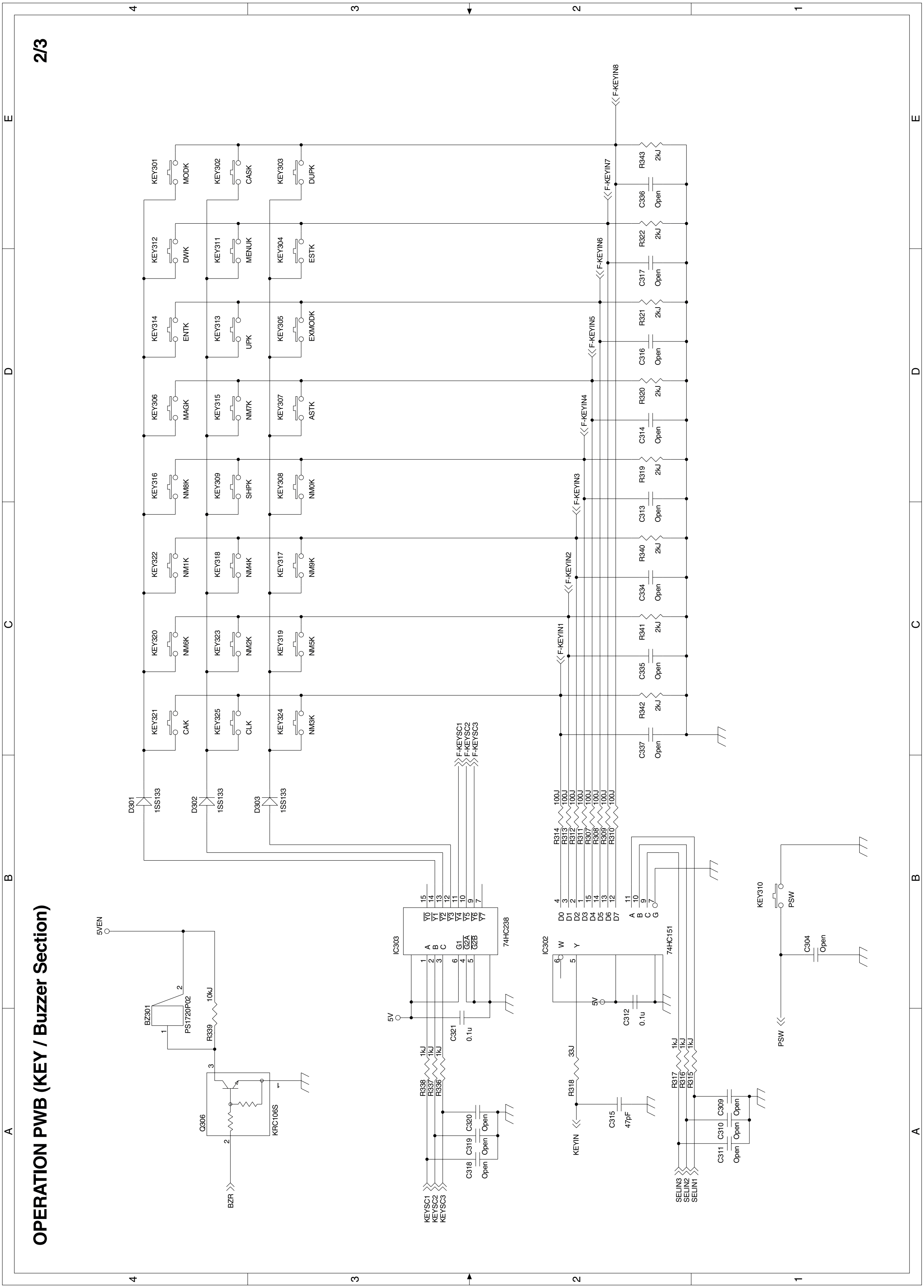


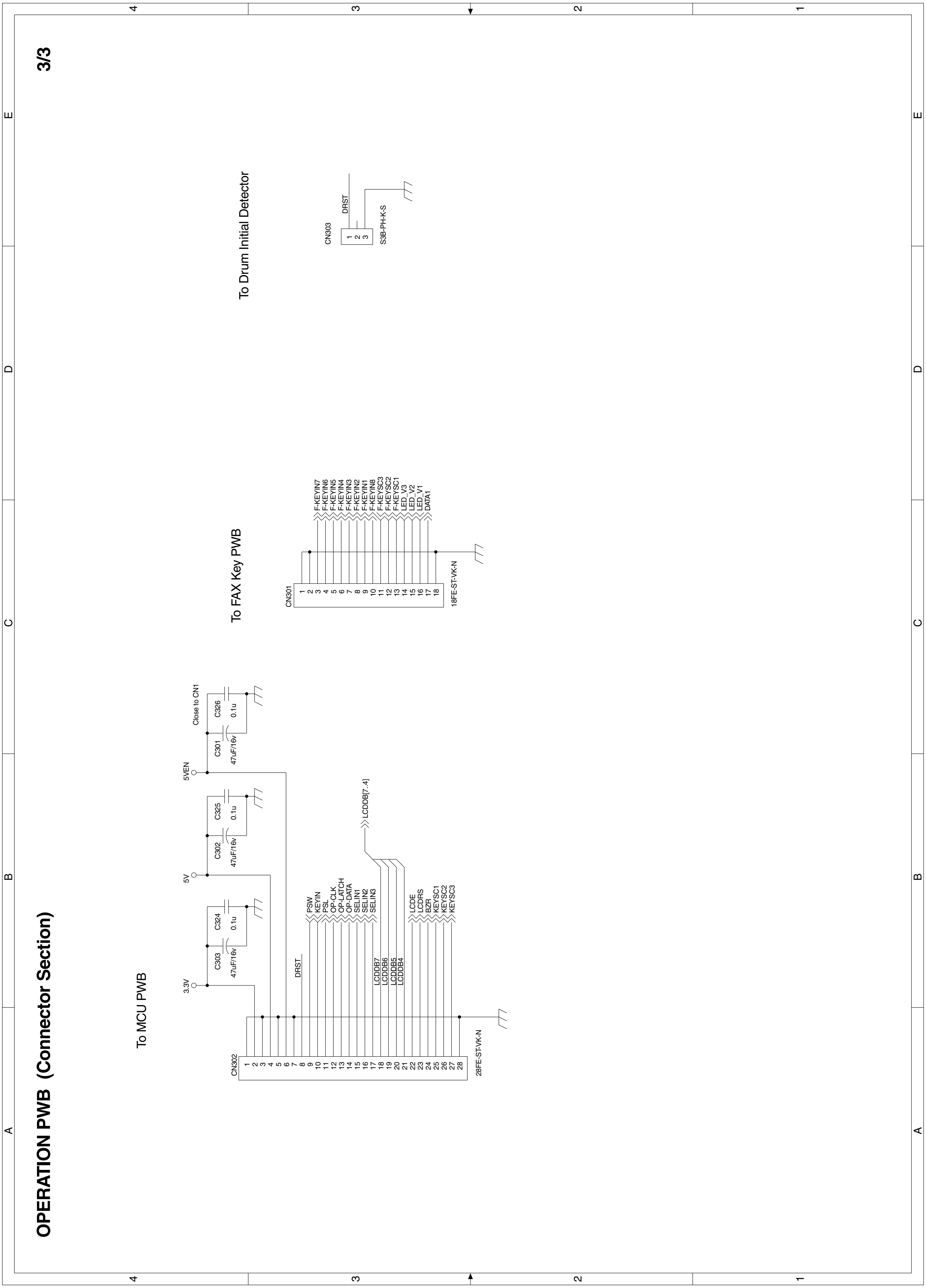
MCU PWB (Modem I/F Connector)
13/14
To Modem PWB
To Modem PWB
CN37
26FE-BT-VK-N
CN38
20FE-BT-VK-N
PB_DATA7
PB_DATA6
PB_DATA5
PB_DATA4
PB_DATA3
PB_DATA2
PB_DATA1
PB_DATA0
MDM_IRQ
PB_ADDR7
PB_ADDR6
PB_ADDR5
PB_ADDR4
PB_ADDR3
PB_ADDR2
PB_ADDR1
PB_ADDR0
(8-A3) (9-B3) (9-B3) PB_DATA[7:0]
(8-A3) (9-B3) PB_ADDR[7:0]
(8-A3) PB_NCS1
(9-A2) (8-A3) PB_NAE0
(9-B2) (8-A3) PB_NOE
(2-D1) /OA_RST
(8-A2) MDM_IRQ
C402
0.1u
VCC3
R357 N.M.
IC46
NC7S32M5X
(9-B2) (8-A3) PB_NWE
(2-D1) /FWREN
24V
EN5V
PGND
(1-D2) (2-A1) (3-A1) (4-A2) D[15..0]
D7
D6
D5
D4
D3
D2
D1
D0
MSU_ST1
R306
10kJ
(1-B3) (2-C1) (4-A3) MODEM_IN
(3-A2) /RD
(1-D3) /CS4
(1-A3) MSU_ST1
C359 OPEN
C360 OPEN
C361 OPEN
C362 OPEN
C363 OPEN
C364 OPEN
C365 OPEN
C366 OPEN
C367 OPEN
C368 OPEN
C369 OPEN
C370 OPEN
C371 OPEN
C372 OPEN
C373 OPEN
C374 OPEN
C375 OPEN
C376 OPEN


MCU PWB (Scanner I/F section)
14/14
To Scanner unit
CN3
FF4-32-S15D5
12V
EN5V
PGND
VCL
AFE_DB0
AFE_DB1
AFE_DB2
AFE_DB3
AFE_DB4
AFE_DB5
AFE_DB6
AFE_DB7
AFE_SEN
AFE_SDI
BSAMP
VSAMP
AFE_SCK
ADCLK
CCD_PHI1
CCD_PHI2
CCD_CP
CCD_RS
CCD_TG
AFE_DB[7..0]
D32
KDS226
VCC3
R164 10kJ
C212 1000p
R165 1kJ
mt_at_home
Copy Lamp Inverter
CP4 0603FA1.5A
R167 15kJ
C215 0.1u/50V
C214 47u/35V
L9 220uH TWKA-221K
D33 11EQS06
Q4 KTB1151 Y
R168 5.6kJ 1/4W
Q5 KTC3198
R166 10kJ
24V
C213 47u/35V
R170 56kJ
C216 33p
R169 15kJ
CL

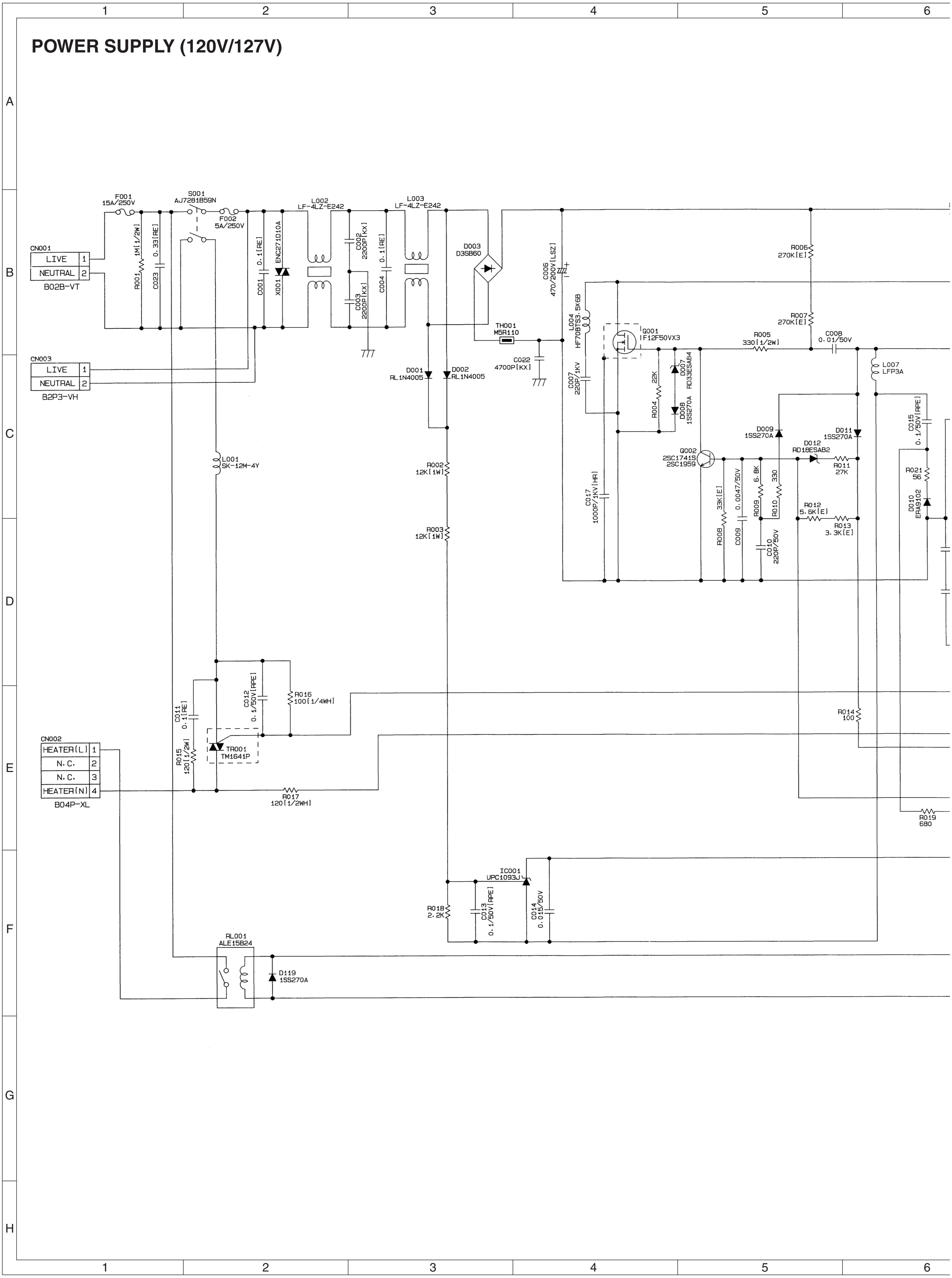
2. OPERATION PWB

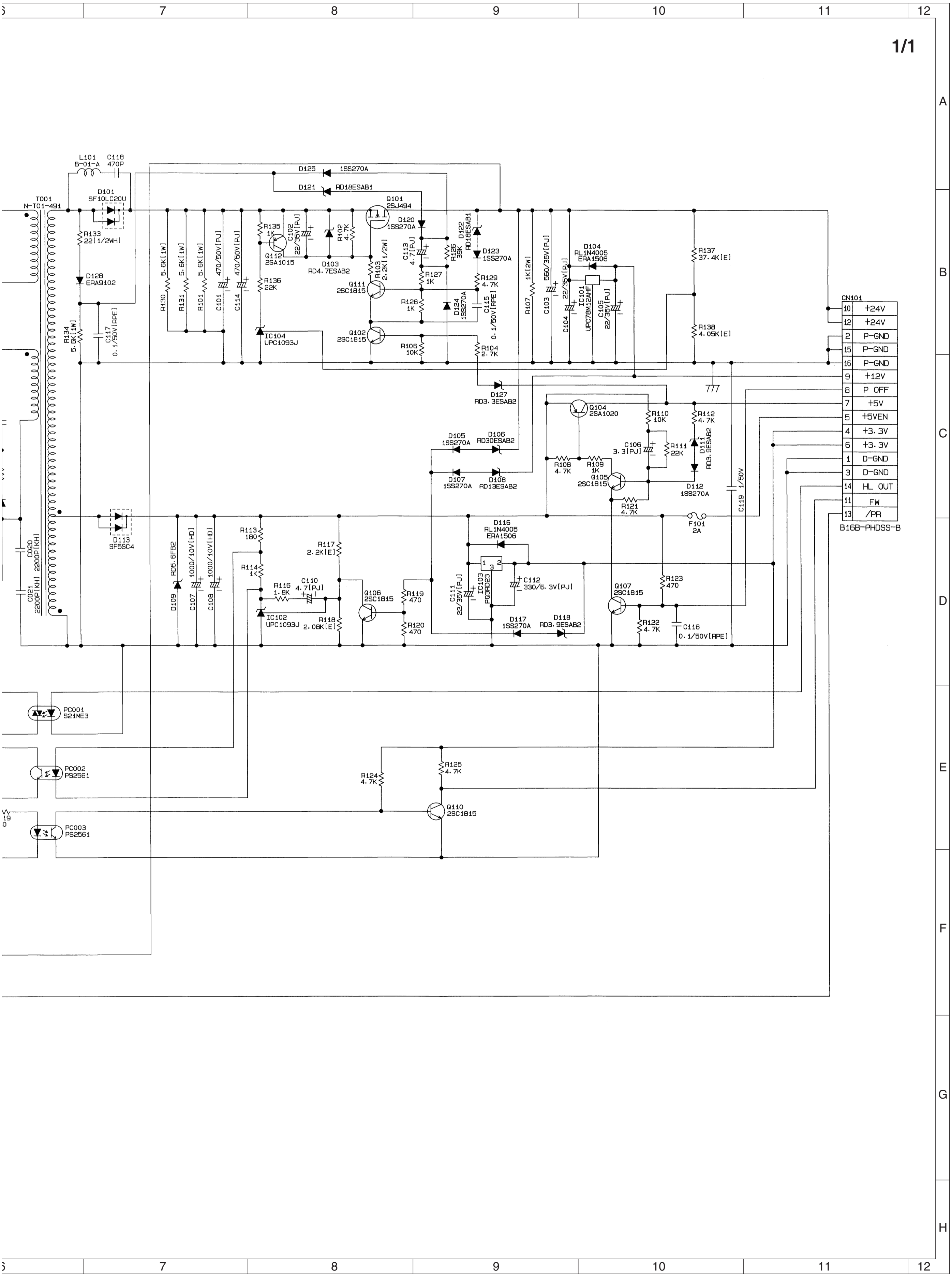



OPERATION PWB (KEY / Buzzer Section)
2/3
IC303
74HC238
IC302
74HC151
BZ301
PS1720P02
Q306
KRC106S
5VEN
BZR
KEYIN
PSW
KEYSC1
KEYSC2
KEYSC3
SELIN1
SELIN2
SELIN3
F-KEYSC1
F-KEYSC2
F-KEYSC3
F-KEYIN1
F-KEYIN2
F-KEYIN3
F-KEYIN4
F-KEYIN5
F-KEYIN6
F-KEYIN7
F-KEYIN8


OPERATION PWB (Connector Section)
3/3
To MCU PWB
To FAX Key PWB
To Drum Initial Detector
CN302
28FE-ST-VK-N
CN301
18FE-ST-VK-N
CN303
S3B-PH-K-S
DRST
3.3V
5V
5VEN
C303
47uF/16v
C324
0.1u
C302
47uF/16v
C325
0.1u
C301
47uF/16v
C326
0.1u
Close to CN1
PSW
KEYIN
PSL
OP-CLK
OP-LATCH
OP-DATA
SELIN1
SELIN2
SELIN3
LCDDB7
LCDDB6
LCDDB5
LCDDB4
LCDDB[7..4]
LCDE
LCDRS
BZR
KEYSC1
KEYSC2
KEYSC3
F-KEYIN7
F-KEYIN6
F-KEYIN5
F-KEYIN4
F-KEYIN3
F-KEYIN2
F-KEYIN1
F-KEYIN8
F-KEYSC3
F-KEYSC2
F-KEYSC1
LED_V3
LED_V2
LED_V1
DATA1

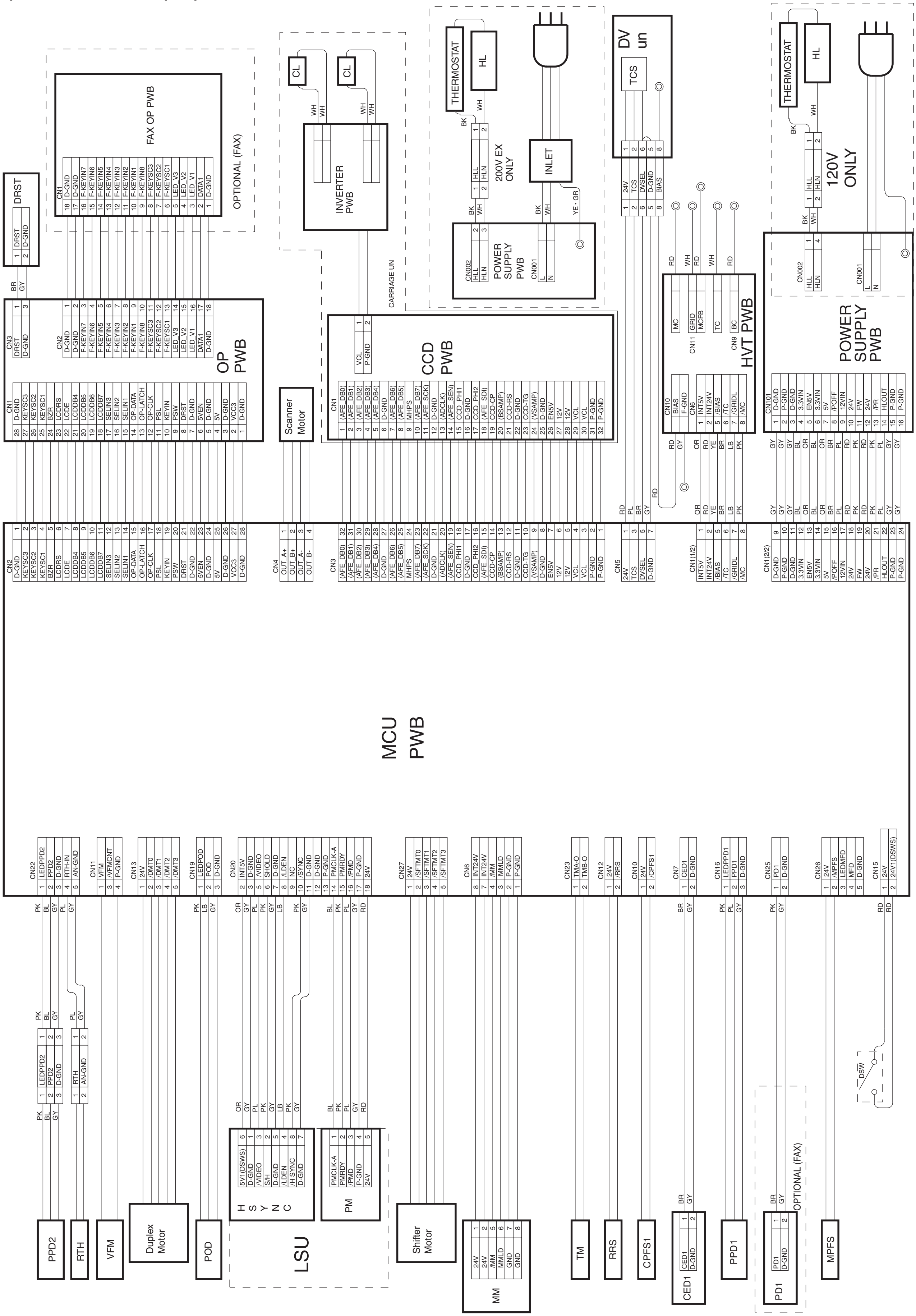
3. POWER SUPPLY



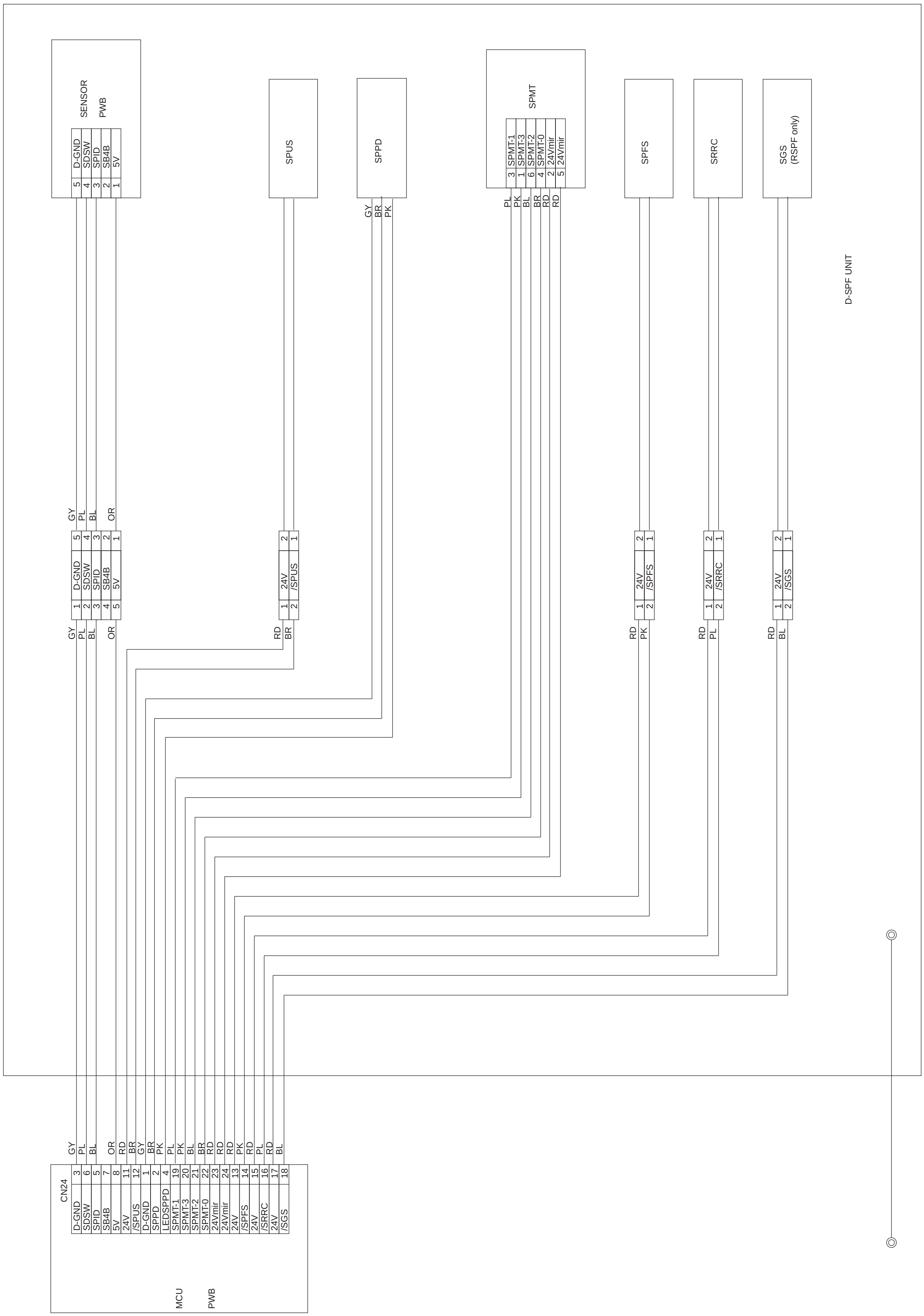

1/1
L101
B-01-A
C118
470P
D101
SF10LC20U
T001
N-T01-491
R133
22(1/2WH)
D128
ERA9102
R134
5.6K(1W)
C117
0.1/50V(RPE)
D125
1SS270A
D121
RD16ESAB1
Q101
2SJ494
D120
1SS270A
R135
1K
C102
22/35V(PJ)
Q112
2SA1015
R102
4.7K
D103
RD4.7ESAB2
R136
22K
IC104
UPC1093J
R130
R131
R101
5.6K(1W)
C101
470/50V(PJ)
C114
470/50V(PJ)
R103
2.2K(1/2W)
Q111
2SC1815
C113
4.7(PJ)
R126
39K
R127
1K
R128
1K
Q102
2SC1815
R106
10K
D122
RD16ESAB1
D123
1SS270A
R129
4.7K
D124
1SS270A
C115
0.1/50V(RPE)
R104
2.7K
D127
RD3.3ESAB2
R107
1K(2W)
C103
560/35V(PJ)
C104
22/35V(PJ)
D104
RL1N4005
ERA1506
IC101
UPC78M12AHF
C105
22/35V(PJ)
R137
37.4K(E)
R138
4.05K(E)
CN101
10 +24V
12 +24V
2 P-GND
15 P-GND
16 P-GND
9 +12V
8 P OFF
7 +5V
5 +5VEN
4 +3.3V
6 +3.3V
1 D-GND
3 D-GND
14 HL OUT
11 FW
13 /PR
B16B-PHDSS-B
Q104
2SA1020
R110
10K
R112
4.7K
D105
1SS270A
D106
RD30ESAB2
D107
1SS270A
D108
RD13ESAB2
C106
3.3(PJ)
R111
22K
D111
RD3.9ESAB2
R108
4.7K
R109
1K
Q105
2SC1815
D112
1SS270A
R121
4.7K
C119
1/50V
D113
SF5SC4
C020
2200P(KH)
C021
2200P(KH)
D109
RD5.6FB2
C107
1000/10V(HD)
C108
1000/10V(HD)
R113
180
R114
1K
R117
2.2K(E)
R116
1.8K
C110
4.7(PJ)
IC102
UPC1093J
R118
2.08K(E)
Q106
2SC1815
R119
470
R120
470
D116
RL1N4005
ERA1506
C111
22/35V(PJ)
IC103
PQ3RD23
C112
330/6.3V(PJ)
D117
1SS270A
D118
RD3.9ESAB2
F101
2A
R123
470
Q107
2SC1815
R122
4.7K
C116
0.1/50V(RPE)
PC001
S21ME3
PC002
PS2561
PC003
PS2561
R124
4.7K
R125
4.7K
Q110
2SC1815

4. ACTUAL WIRING DIAGRAM

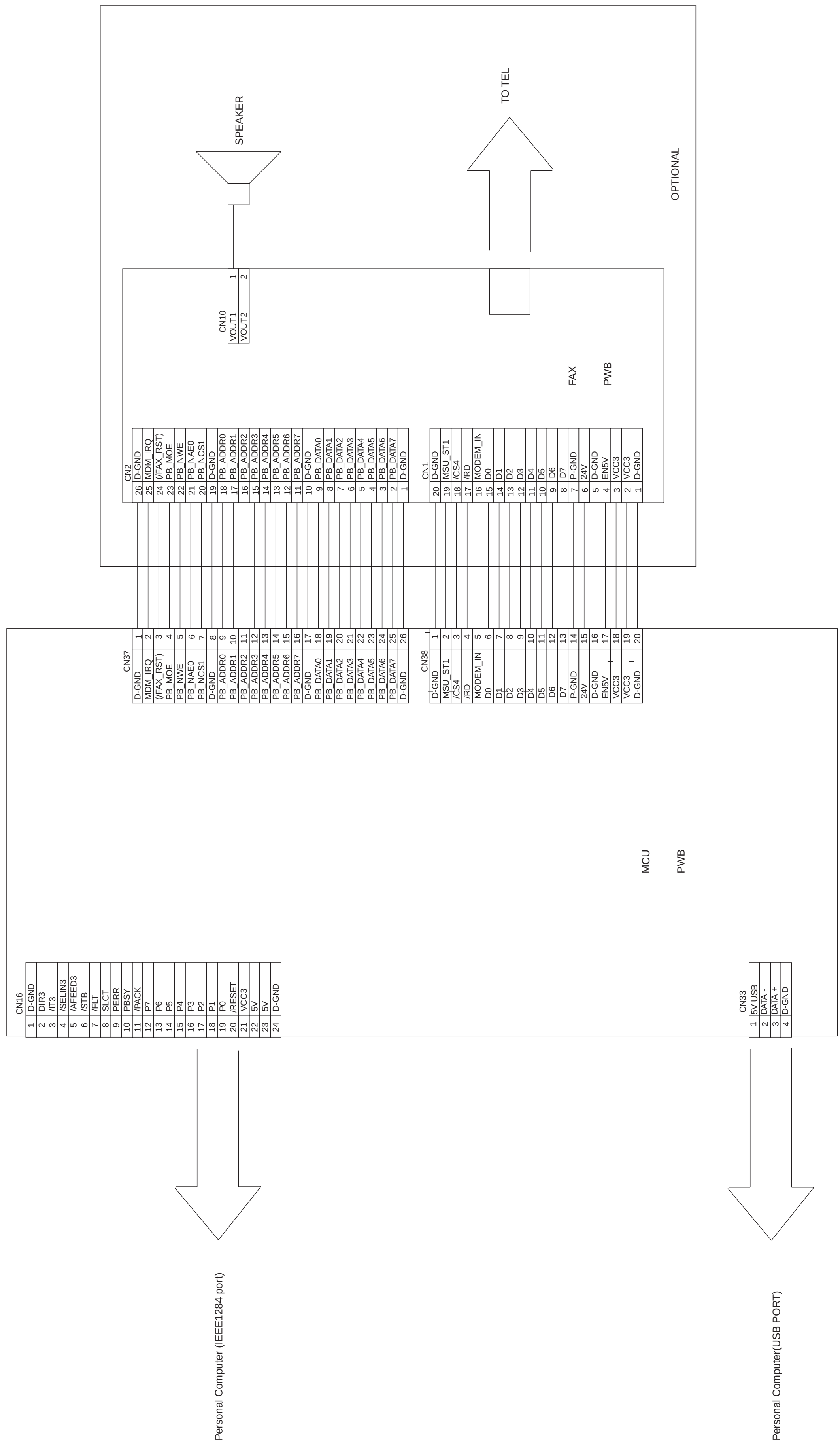
(1) MCU SECTION (1/3)



(2) RSPF/SPF SECTION (Optional) (2/3)



(3) I/F & FAX (Optional) SECTION (3/3)



[15] FIRMWARE DOWNLOAD PROCEDURES

[Preparation]

Write the download data (extension .dwl) into the main unit.

A USB port is required for the PC.

Create "MaintenanceTool " folder in the PC, and copy the following files to the folder.

Necessary for program download

- Maintenance.exe (← Tool program)
- ProcModelB.mdl
- ProcModelC.mdl
- ProcModelE.fmt
- ProcModelE.ini
- ProcModelE.mdl

Driver

- Drivers/2kXP/Mainte.inf (For Windows XP/2000)
- Drivers/Win9xME/Mainte.inf (For Windows Me/98SE)
- Drivers/Win9xME/UsbScan.sys (For Windows Me/98SE)

Download file

- Download file (extension .dwl)

Note: Copy the download data file (extension .dwl) to the folder in which the maintenance program is included.

When making a folder for the maintenance tool in the PC, do not put a long folder name in the absolute path.

[Example]

Erroneous case: c:\Mainte nance Tool Download

Proper case: c:\MaintenanceTool

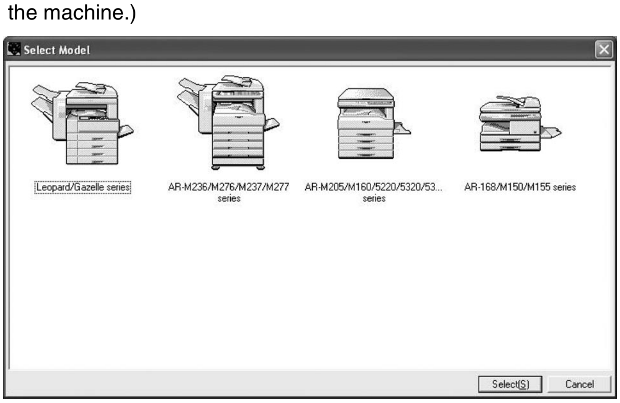
1. Initial setting (Serial number setting procedures)

The serial number is set to the PC which is used for downloading. Setting is required once only, and there is no need to set again when rebooting the program.

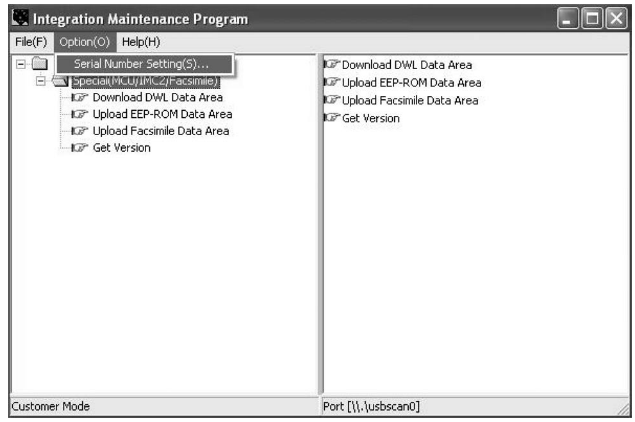
Note: This setting is required only when downloading the default data of E2PROM, and is not required when downloading firmware only.

1) PC side: Boot "Maintenance.exe" and select "AR-168/M150/M155 series" in the "Select Model" menu.

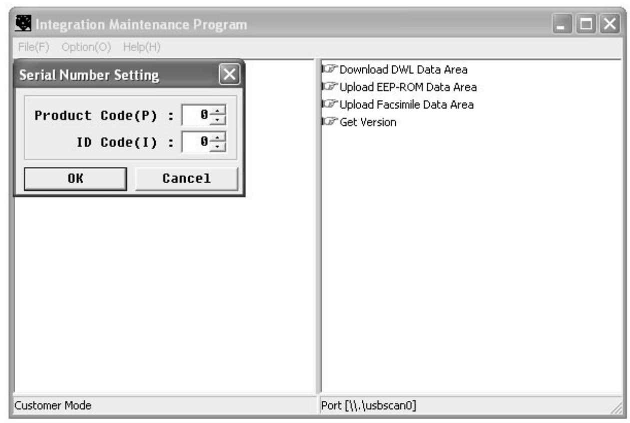
(Only to set the serial number, the PC should not be connected to the machine.)



2) Select "Option" → "Serial Number Setting" on the menu bar.



3) Set the serial number according to the following.



Product Code (P): Enter number (0 – 99)
Enter the product code of "3."

ID Code(I): Enter number (0 – 99)
Assign an individual code to each PC uses "Maintenance.exe."

After completion setting, press [OK] key.

4) The serial number has been assigned.

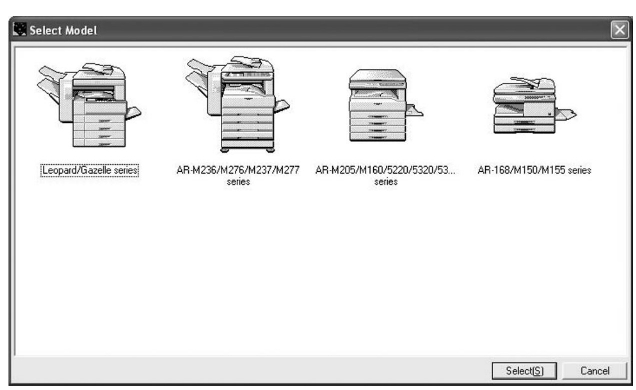
2. Download procedures

1) Main unit side: Execute Test command No. 49-01 (Flash ROM program write mode).

Check that "DOWNLOAD MODE" is displayed on the LCD of the operation panel. (Press and hold [CA] key and [DOWN] key (left key) together, and turn on the power simultaneously.)

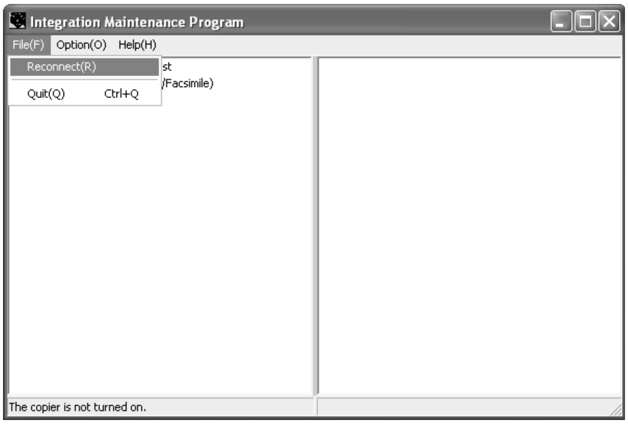
2) Connect machine and the PC with a USB cable. (Connect it to the USB port on the main unit without fail.

3) PC side: Boost "Maintenance.exe" and select "AR-168/M150/M155 series" in the Select Model menu.

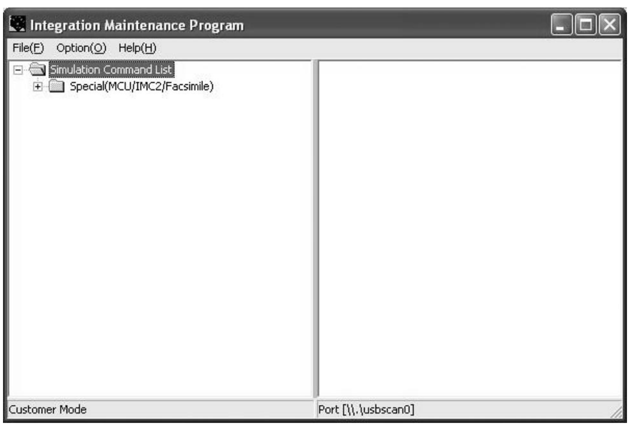


4) PC side: Check that the "Simulation Command List" tree is displayed on the integration maintenance program.

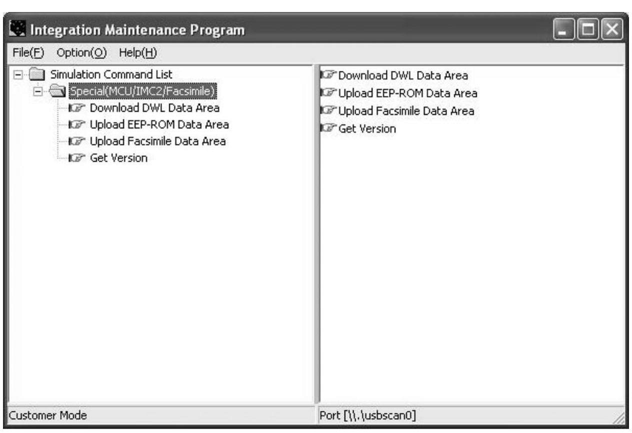
5) PC side: When the integration maintenance program is boosted and "The copier is not turned on." is displayed at the bottom of display, select "File" → "Reconnect" on the menu bar.



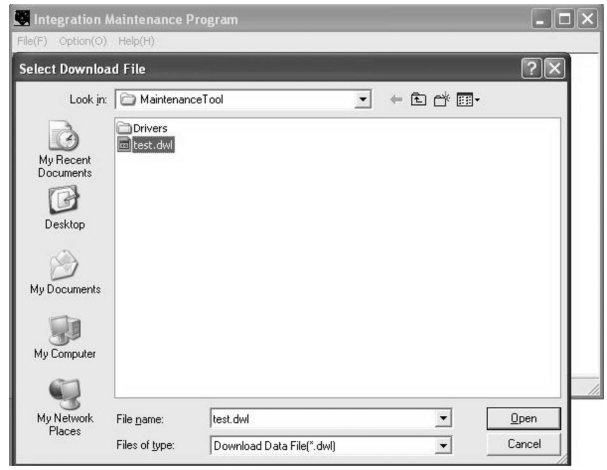
6) PC side: Check that trees are displayed in the "Special (MCU/IMC2/Facsimile)" folder in the integration maintenance program. (If trees are not displayed, check that the USB connector is connected, and select "Reconnect" in procedure 5) again.)



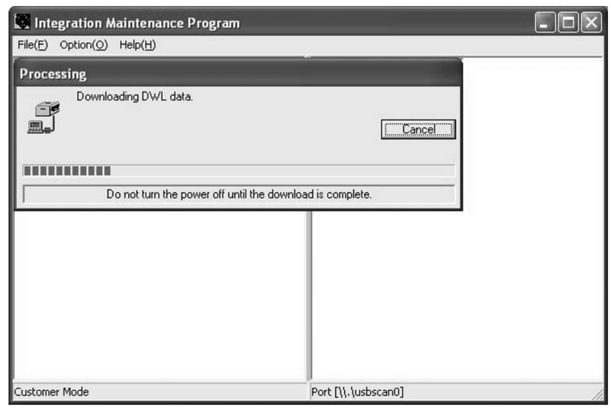
7) PC side: Double-click "Special (MCU/IMC2/Facsimile)" in the main tree to develop its sub trees, and double-click "Download DWL Data Area" in the sub trees.



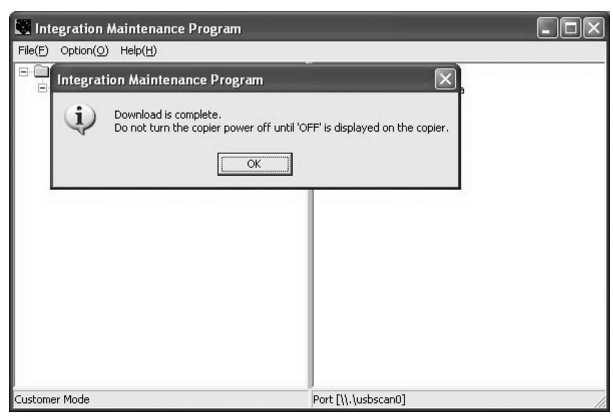
8) PC side: Specify the download file (*****.dwl) to be used.



9) PC side: When a download file is specified, downloading is performed automatically.



10) PC side: When download is completed, the following message is displayed.



Note: Since, however, the machine enters the download data write state, do not turn OFF the power of the machine at this moment.

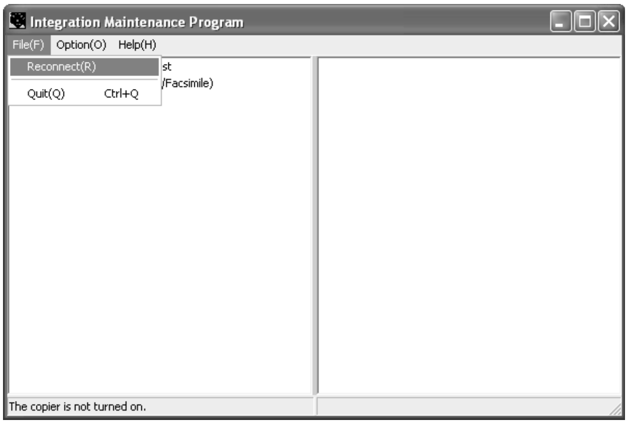
11) Main unit side: Wait until "DOWNLOAD COMPLETE!" is displayed on the LCD of the operation panel. When "DOWNLOAD COMPLETE!" is displayed, download is completed.

    Turn OFF the power of the machine, and disconnect the USB cable.

12) Terminate the integration maintenance program, and turn ON the machine again.

Download is completed with the above procedures.

Note: When another machine is connected, connect the USB cable again and select "File" → "Reconnect" on the menu bar of the integration maintenance program. Repeat the above procedures from 5).



∗ Inhibition during download (Important)

If download is failed, the next download may not be executed. Use great care not to execute the following items during download.

- Never turn off the machine.
- Never disconnect the download cable (USB cable).

*** If the above inhibition item occurs during downloading, turn OFF/ON the power.**

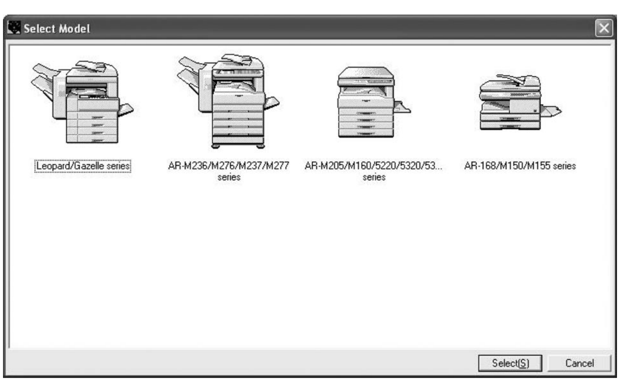
1) When "DOWNLOAD MODE" is displayed on the operation panel, execute the download procedure again.
2) If "DOWNLOAD MODE" is not displayed on the operation panel, turn OFF the power and press and hold [CA] key and [DOWN] key (left key) and turn ON the power. Check that "DOWNLOAD MODE" is displayed on the operation panel, and execute the download procedure again.

   If "DOWNLOAD MODE" is not still displayed, replace the MCU with a new one.

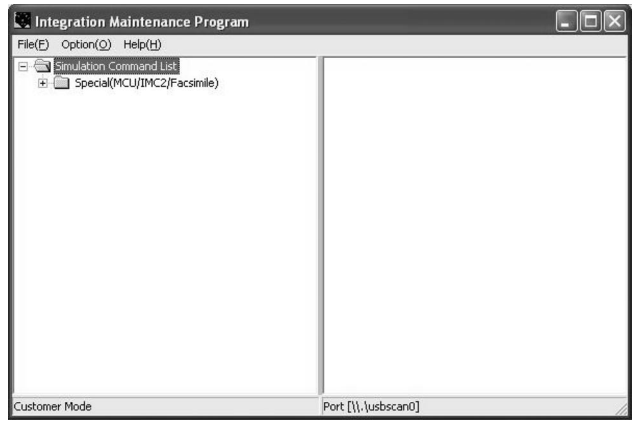
3. Version acquisition procedures

1) Main unit side: Execute Test command No. 49-01 (Flash ROM program write mode).

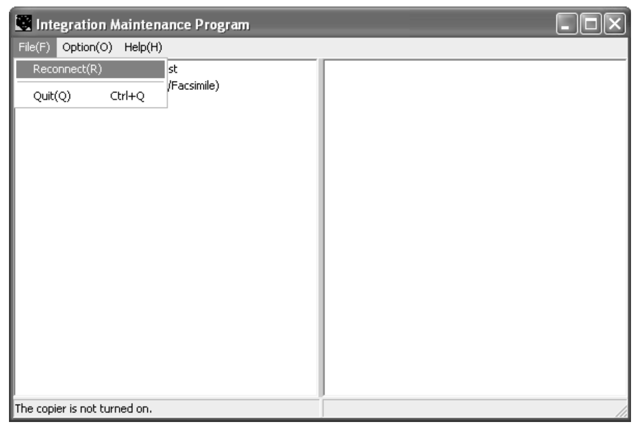
   Check that "DOWNLOAD MODE" is displayed on the operation panel of the main unit. (Press and hold [CA] key and [DOWN] key (left key) together, and turn on the power simultaneously.)
2) Connect the machine and the PC with a USB cable.
3) PC side: Boost "Maintenance.exe" and select "AR-168/M150/M155 series" in the "Select Model" menu.



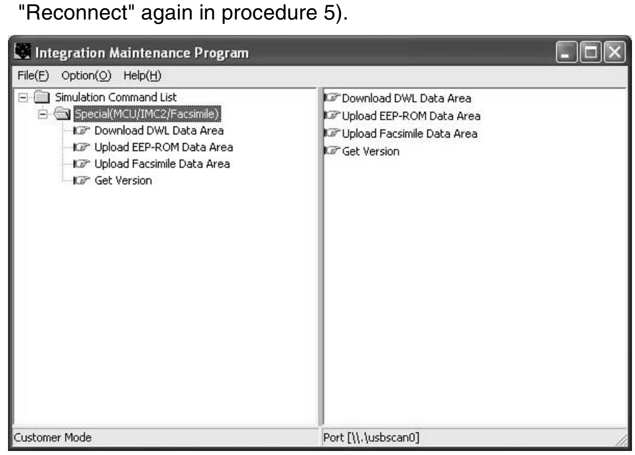
4) PC side: Check that the "Simulation Command List" tree on the integration maintenance program.



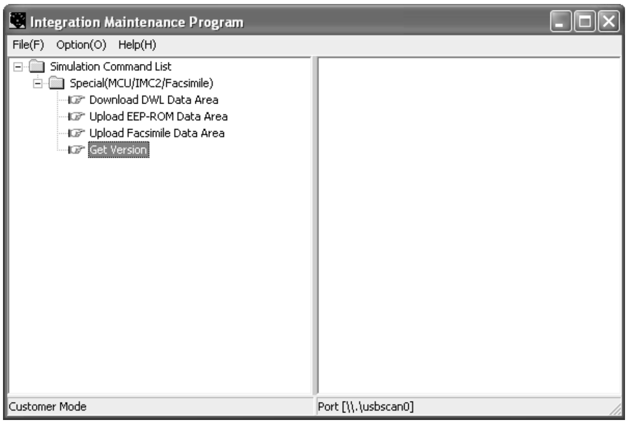
5) PC side: Boot the integration maintenance program. If "The copier is not turned on." is displayed, select "File" → "Reconnect" on the menu bar.



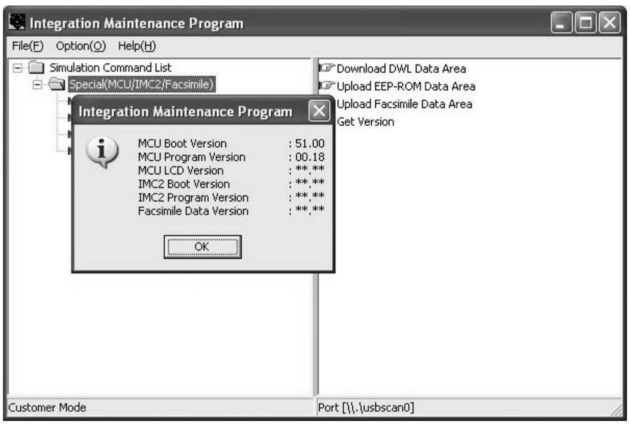
6) PC side: Check that trees are displayed on "Special (MCU/IMC2/ Facsimile" in the integration maintenance program. (If trees are not displayed, check that the USB cable is connected and select "Reconnect" again in procedure 5).



7) PC side: Double-click "Special (MCU/IMC2/Facsimile)" in the main tree items to develop its sub trees. Select "Get Version" in the sub trees.



8) Check that the following display is shown.



With the above procedures, version acquisition is completed.

- The display of "**.**" means its version is not downloaded. The downloaded versions are displayed in a version number as shown in “MCU Boot Version” and “MCU program Version”.

4. EEPROM data acquisition procedure

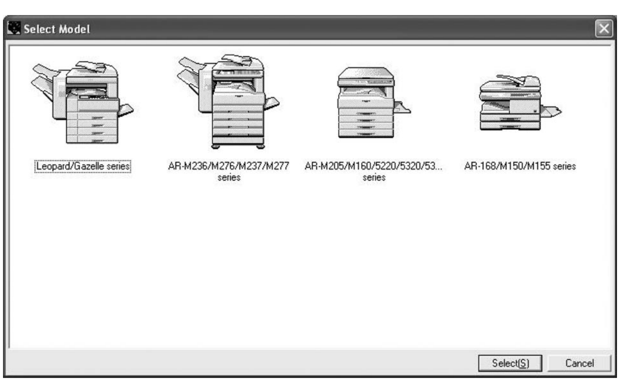
EEPROM data is acquired to the PC. Use this procedure as data maintenance of EEPROM.

1) Main unit side: Execute Test command No. 49-01 (Flash ROM program write mode).

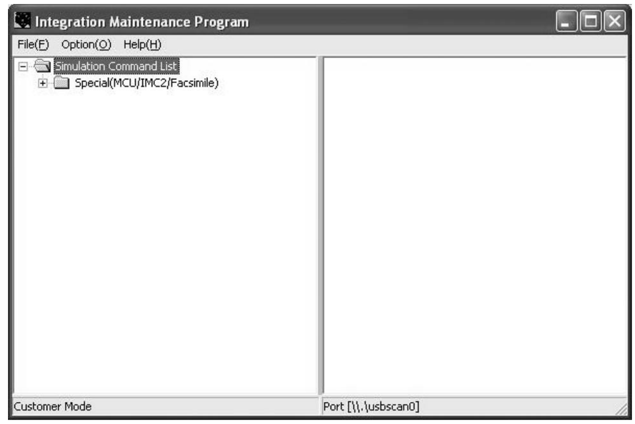
   Check that "DOWNLOAD MODE" is displayed on the operation panel of the main unit. (Press and hold [CA] key and [DOWN] key (left key) together, and turn on the power simultaneously.)

2) Connect the machine and the PC with a USB cable.

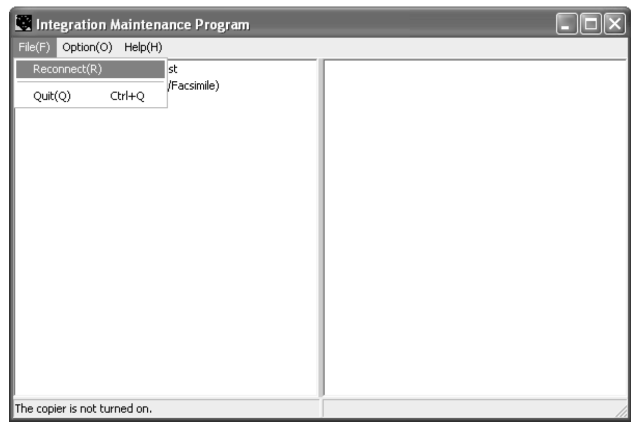
3) PC side: Boot "Maintenance.exe" and select "AR-168/M150/M155 series" in the "Select Model" menu.



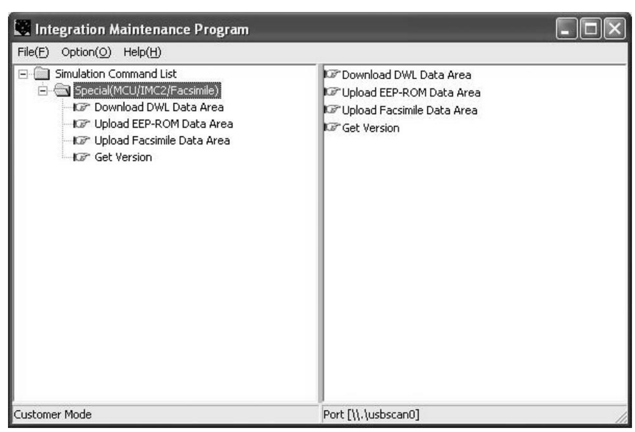
4) PC side: Check that "Simulation Command List" tree is displayed in the integration maintenance program.



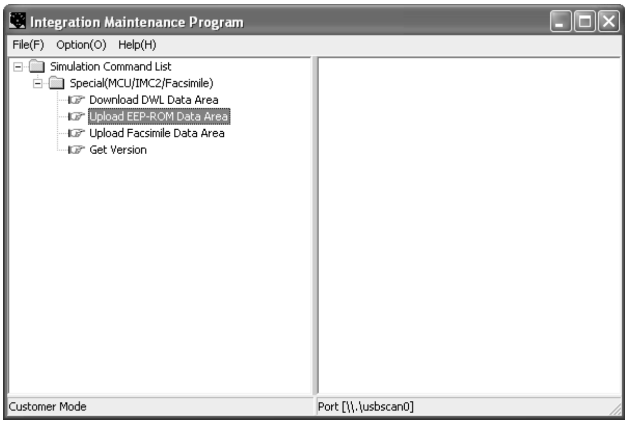
5) PC side: Boot the integration maintenance program. If "The copier is not turned on." is displayed on the lower side of the display, select "File" → "Reconnect" on the menu bar.



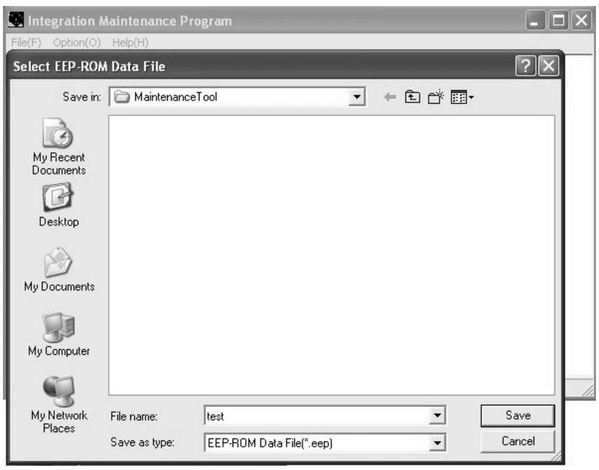
6) PC side: Check that trees are displayed on "Special (MCU/IMC2/Facsimile" in the integration maintenance program. (If trees are not displayed, check that the USB cable is connected and select "Reconnect" again in procedure 5).



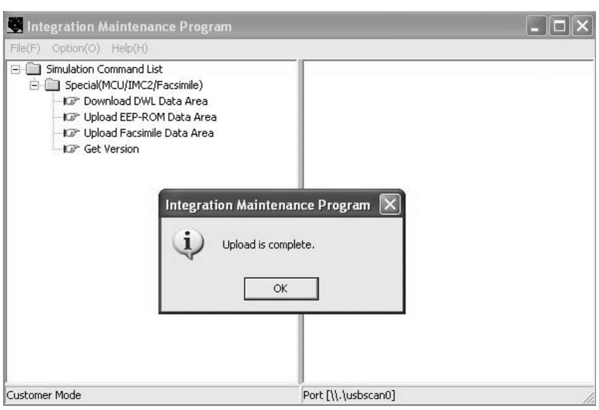
7) PC side: Double-click "Special (MCU/IMC2/Facsimile)" to develop its sub trees, and select "Upload EEPROM Data Area" in the sub trees.



8) PC side: Enter a desired file name, and select "Save."



9) PC side: When upload is completed, the complete message is displayed.



With the above procedure, the EEPROM data acquisition is completed.

Data acquired by the EEPROM data acquisition procedure are saved in a file with extension of .eep.

5. Installing procedures

<USB integration maintenance program installation>

Driver installation is made on plug-and-play.

<Installation on Windows XP>

1) Main unit side: Execute Test command No. 49-01 (Flash ROM program write mode).

   Check that "DOWNLOAD MODE" is displayed on the LCD of the operation panel. (Press and hold [CA] key and [DOWN] key (left key) together, and turn on the power simultaneously.)

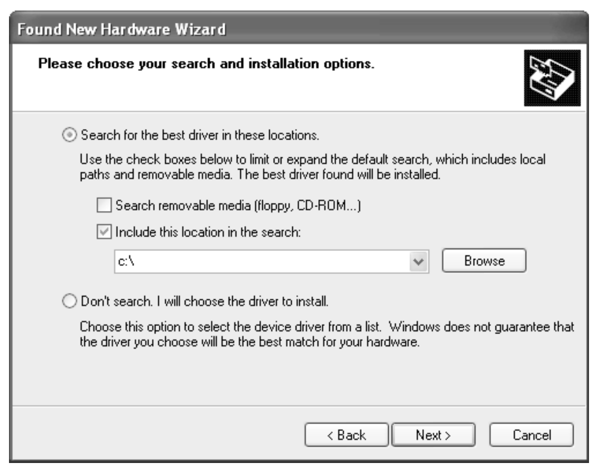
2) Connect the machine and the PC with a USB cable.

3) The following display is shown.

   Select [Install from a list or specific location] and press <Next> button.

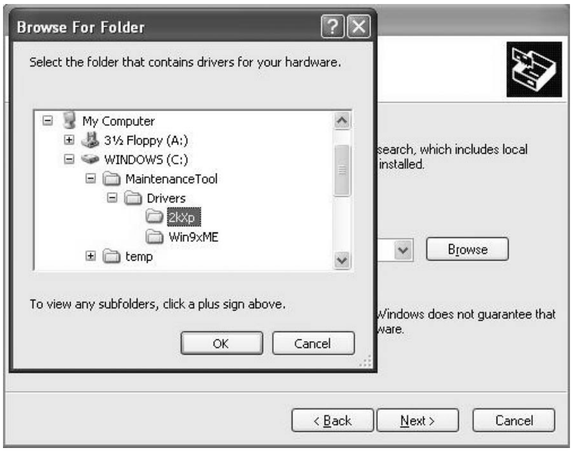


4) Select [Include this location in the search;]. If the search location is not the folder which includes the maintenance tool driver (Mainte.inf), select <Browse>. If the search location is the folder which includes the maintenance tool driver, press <Next> button to go to procedure 7).

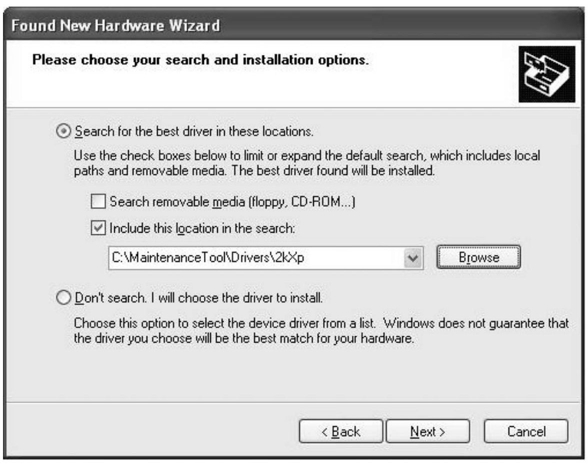


5) Select the folder which includes the maintenance tool driver (Mainte.inf) and press <OK> button.

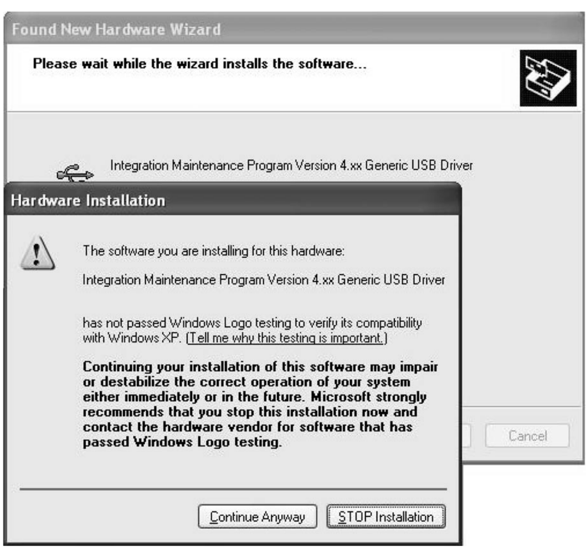
(Suppose that the driver is included in C:\MaintenanceTool\Drivers\2kXp folder.)



6) Check the path to the folder which includes the maintenance tool driver (Mainte.inf), and press <Next> button.



7) When the following display is shown, press [Continue Anyway] button.



8) When the following display is shown, installation is completed.

Press <Finish> button.



With the above procedures, installation (on Windows XP) of the integration maintenance program is completed.

<Installation on Windows 2000>

1) Main unit side: Execute Test command No. 49-01 (Flash ROM program write mode).

Check that "DOWNLOAD MODE" is displayed on the LCD of the operation panel. (Press and hold [CA] key and [DOWN] key (left key) together, and turn on the power simultaneously.)

2) Connect the machine and the PC with a USB cable.

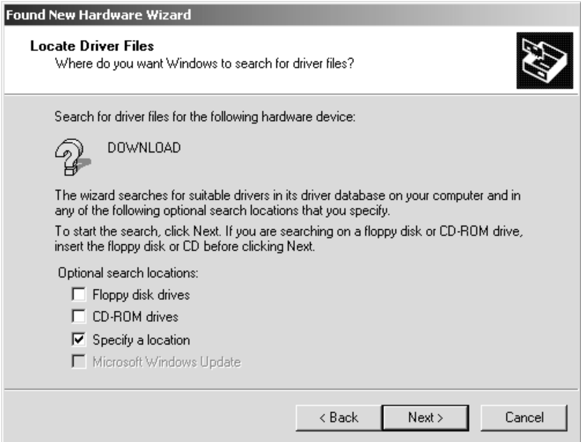
3) Check that the Found New Hardware Wizard is displayed, and press <Next> button.



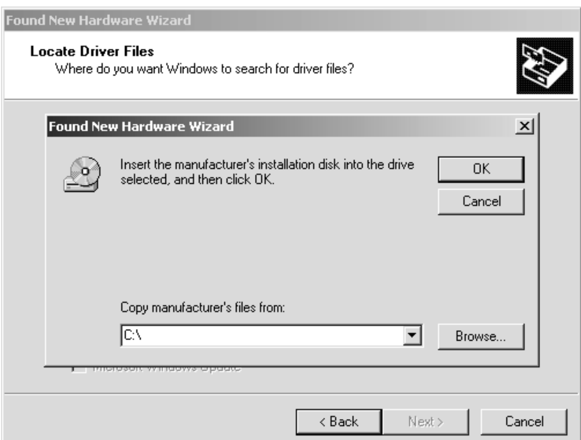
4) Select [Search for a suitable driver for my device] and press <Next> button.



5) Select [Specify a location] and press <Next> button.



6) Select [Include this location in the search;]. If the search location is not the folder which includes the maintenance tool driver (Mainte.inf), select <Browse>. If the search location is the folder which includes the maintenance tool driver, press <Next> button to go to procedure 9).

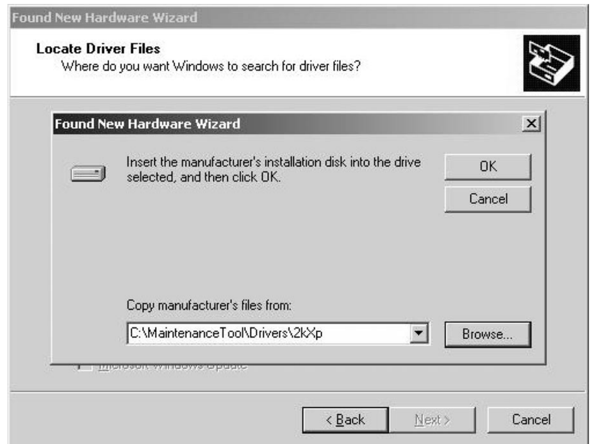


7) Specify the folder which includes the maintenance tool driver (Mainte.inf), and press <Open> button.



8) Check that the path to the folder which includes the maintenance tool driver (Mainte.inf) is displayed, and press <OK> button.

(Suppose that the maintenance tool driver is included in C:\MaintenanceTool\Drivers\2kXp folder.)



9) Press <Next> button to start installation.



10) When the following display is shown, installation is completed. Press <Finish> button.



11) Restart the PC.

With the above procedures, installation (on Windows 2000) of the integration maintenance program is completed.

<Installation on Windows Me>

1) Main unit side: Execute Test command No. 49-01 (Flash ROM program write mode).

   Check that "DOWNLOAD MODE" is displayed on the LCD of the operation panel. (Press and hold [CA] key and [DOWN] key (left key) together, and turn on the power simultaneously.)

2) Connect the machine and the PC with a USB cable.

3) The following display is shown on the PC side.

   Select [Specify the location of the driver], and press <Next> button.



4) Select [Specify a location], specify the folder which includes the maintenance tool driver (Mainte.inf) as the search location, and press <Next> button.

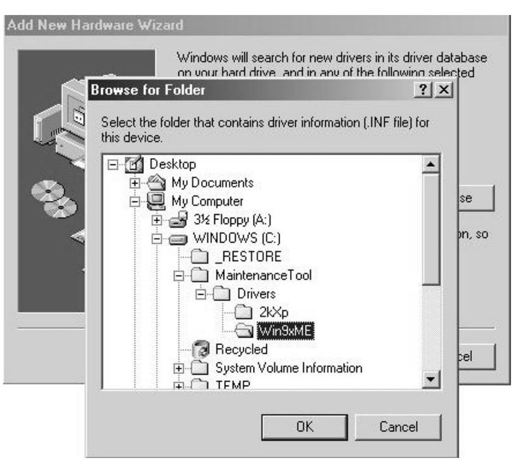
   If the search location does not include the maintenance tool driver (Mainte.inf), press <Browse> button to specify the folder which includes the maintenance tool driver (Mainte.inf).

   (Suppose that the maintenance tool driver is included in C:\MaintenanceTool\Drivers\Win9xMe folder.)



5) Select the folder which includes maintenance tool driver (Mainte.inf), and press <OK> button.

   (Suppose that the driver is included in C:\MaintenanceTool\Drivers\Win9xMe folder.)



6) Check that the path to the folder which includes the maintenance tool driver (Mainte.inf) is displayed, and press <Next> button.



7) When the following display is shown, installation is completed. Press <Finish> button.



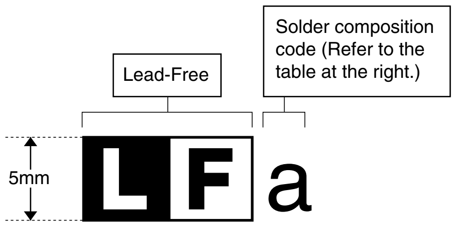
8) Restart the PC.

With the above procedures, installation (on Windows ME) of the integration maintenance program is completed.

LEAD-FREE SOLDER

The PWB's of this model employs lead-free solder. The "LF" marks indicated on the PWB's and the Service Manual mean "Lead-Free" solder.
The alphabet following the LF mark shows the kind of lead-free solder.

Example:



<Solder composition code of lead-free solder>

Solder composition	Solder composition code
Sn-Ag-Cu	a
Sn-Ag-Bi Sn-Ag-Bi-Cu	b
Sn-Zn-Bi	z
Sn-In-Ag-Bi	i
Sn-Cu-Ni	n
Sn-Ag-Sb	s
Bi-Sn-Ag-P Bi-Sn-Ag	p

(1) NOTE FOR THE USE OF LEAD-FREE SOLDER THREAD

When repairing a lead-free solder PWB, use lead-free solder thread.

Never use conventional lead solder thread, which may cause a breakdown or an accident.

Since the melting point of lead-free solder thread is about 40°C higher than that of conventional lead solder thread, the use of the exclusive-use soldering iron is recommendable.

(2) NOTE FOR SOLDERING WORK

Since the melting point of lead-free solder is about 220°C, which is about 40°C higher than that of conventional lead solder, and its soldering capacity is inferior to conventional one, it is apt to keep the soldering iron in contact with the PWB for longer time. This may cause land separation or may exceed the heat-resistive temperature of components. Use enough care to separate the soldering iron from the PWB when completion of soldering is confirmed.

Since lead-free solder includes a greater quantity of tin, the iron tip may corrode easily. Turn ON/OFF the soldering iron power frequently.

If different-kind solder remains on the soldering iron tip, it is melted together with lead-free solder. To avoid this, clean the soldering iron tip after completion of soldering work.

If the soldering iron tip is discolored black during soldering work, clean and file the tip with steel wool or a fine filer.

CAUTION FOR BATTERY REPLACEMENT

(Danish) ADVARSEL !

Lithiumbatteri – Eksplosionsfare ved fejlagtig håndtering.
Udskiftning må kun ske med batteri
af samme fabrikat og type.
Levér det brugte batteri tilbage til leverandoren.

(English) Caution !

Danger of explosion if battery is incorrectly replaced.
Replace only with the same or equivalent type
recommended by the manufacturer.
Dispose of used batteries according to manufacturer's instructions.

(Finnish) VAROITUS

Paristo voi räjähtää, jos se on virheellisesti asennettu.
Vaihda paristo ainoastaan laitevalmistajan suosittelemaan
tyyppiin. Hävitä käytetty paristo valmistajan ohjeiden
mukaisesti.

(French) ATTENTION

Il y a danger d'explosion s' il y a remplacement incorrect
de la batterie. Remplacer uniquement avec une batterie du
même type ou d'un type équivalent recommandé par
le constructeur.
Mettre au rebut les batteries usagées conformément aux
instructions du fabricant.

(Swedish) VARNING

Explosionsfara vid felaktigt batteribyte.
Använd samma batterityp eller en ekvivalent
typ som rekommenderas av apparattillverkaren.
Kassera använt batteri enligt fabrikantens
instruktion.

(German) Achtung

Explosionsgefahr bei Verwendung inkorrekter Batterien.
Als Ersatzbatterien dürfen nur Batterien vom gleichen Typ oder
vom Hersteller empfohlene Batterien verwendet werden.
Entsorgung der gebrauchten Batterien nur nach den vom
Hersteller angegebenen Anweisungen.

CAUTION FOR BATTERY DISPOSAL

(For USA, CANADA)

"BATTERY DISPOSAL"

THIS PRODUCT CONTAINS A LITHIUM PRIMARY
(MANGANESS DIOXIDE) MEMORY BACK-UP BATTERY
THAT MUST BE DISPOSED OF PROPERLY. REMOVE THE
BATTERY FROM THE PRODUCT AND CONTACT YOUR
LOCAL ENVIRONMENTAL AGENCIES FOR INFORMATION
ON RECYCLING AND DISPOSAL OPTIONS.

"TRAITEMENT DES PILES USAGÉES"

CE PRODUIT CONTIENT UNE PILE DE SAUVEGARDE DE
MÉMOIRE LITHIUM PRIMAIRE (DIOXYDE DE MANGANÈSE)
QUI DOIT ÊTRE TRAITÉE CORRECTEMENT. ENLEVEZ LA
PILE DU PRODUIT ET PRENEZ CONTACT AVEC VOTRE
AGENCE ENVIRONNEMENTALE LOCALE POUR DES
INFORMATIONS SUR LES MÉTHODES DE RECYCLAGE ET
DE TRAITEMENT.

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